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ABSTRACT

The purpose of the hearing reported is to obtain testimony from key officials of the executive branch and from representatives of the voluntary computer standards effort, as to the progress that has been made in the implementation of Public Law 89-306. (For the committee report see LI 003 853.) Interest of the hearing is particularly oriented to the problems that have been encountered as this Government-wide coordinated system of management has been under implementation over the period of the past five years. The delineation of these problem areas will allow the subcommittee to do whatever is necessary to assure continued improvement in the management and use of the Government's vast inventory of computers. (Author/NH)

ED 067109

AUTOMATIC DATA PROCESSING

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HEARING

BEFORE A

SUBCOMMITTEE OF THE
COMMITTEE ON
GOVERNMENT OPERATIONS
HOUSE OF REPRESENTATIVES
NINETY-SECOND CONGRESS
FIRST SESSION

MAY 20, 1971

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AUTOMATIC DATA PROCESSING

THURSDAY, MAY 20, 1971

House of Representatives,
Government Activities Subcommittee
of the Committee on Government Operations,
Washington, D.C.

The subcommittee met, at 10 a.m., in room 2247, Rayburn House Office Building, Hon. Jack Brooks (chairman of the subcommittee) presiding.

Present: Representatives Jack Brooks, John C. Culver, John H. Buchanan, Jr., and Barry M. Goldwater, Jr.

Staff members present: Ernest C. Baynard, staff director; and J. P. Carlson, minority staff, Committee on Government Operations.

Mr. Brooks. The Government Activities Subcommittee, having been duly organized under the Rules of the House of Representatives, will come to order.

In the quarter of a century that has passed since the end of World War II, the electronic computer has come into its own. Despite the countless problem areas and the difficulties in applying computer techniques, practically every phase of human endeavor has been significantly influenced by the availability of this new means of processing data.

Continued technological advances in computer development, broader exploitation of computer potential, and the effective management of the Nation's computer resources, have become matters of crucial importance.

Countless billions of dollars flow into computer hardware and software each year, and the sums dedicated to computer development and use are expected to continue to increase indefinitely.

The effective and efficient exploitation of computer techniques and continued advancements in the state of computer technology have become decisive factors in the economic and military posture of the Nation. If we falter in the development and application of computers, so as to lose our present overwhelming advantage, then the power and the prestige and the prosperity of this Nation as contrasted to other world powers will be compromised.

It is, therefore, incumbent upon all facets of the computer community to recognize the importance of maintaining the Nation's position in the computer sciences.

The Federal Government, as the largest user of computers in the world, has broad responsibilities which cannot be delegated to the private sector of our economy. As the world's largest user of computers, we must, in a responsible manner, fulfill our mandate to the taxpayers to manage this costly equipment efficiently and effectively. We must lead the way in the development of effective national policies that will assure our continued superiority in the area of computers.

We must participate and cooperate in joint efforts with business and industry, with the manufacturers of computers and related hardware, with the software elements of the computer community, and with other users in the development of effective standards and in other areas of mutual national interest.

Our hearing today is to obtain testimony from key officials of the executive branch and from representatives of the voluntary computer standards effort, as to the progress that has been made in the implementation of Public Law 89-306, which originated in this subcommittee some 8 years ago and was approved by the President in October 1965.

Our interest is particularly oriented to the problems that have been encountered as this Government-wide coordinated system of management has been under implementation over the period of the past 5 years.

In an affirmative and constructive environment, the subcommittee wants to delineate these problem areas so that we can do whatever is necessary, through legislation or any other means available to us, to assure continued improvement in the management and use of our Government's vast inventory of computers.

The first witness we would like to call today represents the General Services Administration. He is the Honorable Robert L. Kunzig. I might say that during the 2-year period that Bob Kunzig has served as Administrator of GSA, we have maintained a very close working relationship with him, and insofar as the subcommittee is concerned, we have received the highest level of cooperation in matters affecting the efficiency and the economy of Government operations falling within the jurisdiction of this agency.

Mr. Administrator, would you come on and sit down with your people? Accompanying the Administrator are the Commissioner of the Federal Supply Service, H. A. Abersfeller, and the Deputy Commissioner, Lewis Spangler. In addition, we have George Dodson and Sidney Weinstein.

Before we begin, Mr. Administrator, it is the subcommittee's understanding that Mr. Heinz Abersfeller has recently announced his retirement. Without question, "Abbie", as we all call him, has one of the most distinguished records of public service of anyone in the Federal Government. It would be very difficult, in fact, to praise him too highly.

During the period of his service in the GSA, he has worked in one of the most difficult areas of Government and has displayed the highest level of dedication and ability. The loss of his services to the GSA and to the Government as a whole cannot be readily compensated for by the appointment of any other individual. Because of his long service and longtime cooperation with this committee, we hate to see you leave, Abbie. However, on the part of the subcommittee, we want to offer you our best wishes for much happiness and success in whatever new ventures you may undertake.

Mr. Administrator, do you have an opening statement you would like to give at this time?

STATEMENT OF ROBERT L. KUNZIG, ADMINISTRATOR OF GENERAL SERVICES ADMINISTRATION; ACCOMPANIED BY H. A. ABERSFELLER, COMMISSIONER, FEDERAL SUPPLY SERVICE; LEWIS SPANGLER, DEPUTY COMMISSIONER, FEDERAL SUPPLY SERVICE; GEORGE W. DODSON, ASSISTANT COMMISSIONER FOR AUTOMATED DATA MANAGEMENT SERVICES; ROBERT M. O'MAHONEY, COMMISSIONER, TRANSPORTATION AND COMMUNICATIONS SERVICE; AND SIDNEY WEINSTEIN, DEPUTY ASSISTANT COMMISSIONER FOR AUTOMATED DATA MANAGEMENT SERVICES

Mr. KUNZIG. I do, Mr. Chairman.

I thank you for the very kind words about Mr. Abersfeller, which I would second. We are very sorry he has decided to move into the private sector, but are delighted that he has found something very fine for himself. We are sorry to lose him and we hope he will be with us, helping us out from time to time.

With me are Mr. Abersfeller on my right, Mr. Spangler, the Deputy Commissioner, Mr. Dodson, the Assistant Commissioner for Automatic Data Management Services, and behind me are Mr. O'Mahoney from Telecommunications, and Mr. Weinstein from Automatic Data Management Service, if needed.

It is always a pleasure to discuss automatic data processing with you, Mr. Chairman, and with this subcommittee, because it was this same chairman, and this very subcommittee, that made modern management of the Government's ADP procurement and operations a possibility. I refer, of course, to Public Law 89–306, known throughout GSA—and throughout the Government—as "the Brooks Act."

With your permission, I should like to survey briefly the progress GSA has made in implementing the Brooks Act, some of the problems we have encountered, and some of the challenges still before us in the management of what has become—as the chairman early predicted—an indispensable tool of Government.

When Public Law 89–306 was passed by the Congress in October of 1965, it was correctly assumed that the Government would benefit greatly from its provisions, but that full realization of maximum efficiency and economy under the statutes would evolve over a period of time. While dramatic results and economies have thus far been obtained, these past few years also have seen a gradual implementation of the law, and the laying of the foundations for future actions which we feel will result in even greater economy and efficiency. Although much has been accomplished, the opportunities for further accomplishments are before us.

In this context I will speak of the principle areas of GSA's responsibilities. These involve procurement, resource utilization, Federal data processing centers (FDPC), the ADP fund, and the ADP Management Information System.

Public Law 89–306 has enabled GSA alone to achieve overall reduced costs of approximately $1.1 billion. We have effected cost reductions of about $339.6 million in hardware procurements, and about $92.6 million in procurement of magnetic tape and other supplies. Cost reductions of about $448.8 million were obtained through reutilization of Government-owned excess equipment, and about $250.8 million through the sharing of Government-owned or leased resources.

Initial efforts to implement the act were focused on promulgating rules to assure Government-wide benefit from the economic purchase. lease, and maintenance of ADP equipment, establishment of Federal data processing centers, and most effective utilization of existing resources, including limited ADP fund resources under Office of Management and Budget policy direction.

In the area of procurement management, our first objective was the issuance of a Federal property management regulation to set standards for ADP procurement and generally define GSA's role in servicing the ADP needs of other agencies. At the outset, we decided that the most effective use of manpower within GSA was to handle the procurement of large multiple systems in-house. Thus we delegated to other Federal agencies the authority to make single system procurements under the Federal supply schedule. For multiple system procurement, where the saving potential per procurement was greatest, GSA went outside the Federal supply schedule program to the competitive market, achieving substantially lower prices than otherwise would have been obtained.

Since initiating this procedure in fiscal year 1968, we have awarded 26 contracts for multiple systems on a competitive basis. We are now working with the National Bureau of Standards to establish standardization and objective performance criteria for as many items of equipment as possible, with a view to enhancing both the scope and effectiveness of our centralized competitive procurement.

In the resource utilization area, we have been concentrating on maximum use of excess ADP equipment, sharing, and the Federal Data Processing Centers. We have, for instance, modified the sharing program to require written authorization from GSA before an agency may contract commercially for ADP time and related services.

We also issued regulations establishing GSA's Federal Data Processing Centers. Our objective is to make the FDPCs the primary source of supply for ADP time in cases where it will meet the requirements of Federal agencies more economically. We have begun by installing in the Atlanta FDCP a remote access multiuser system, known as RAMUS. RAMUS provides an interactive time sharing basis for a number of Federal agency users. We are also proceeding to contract for both nationwide and regional interactive and batch services for remote users, utilizing multiplexed communications systems.

The Brooks act created the ADP fund. This revolving fund finances, on a reimbursable basis, ADP services such as the equipment lease program, software program, Federal Data Processing Centers, and the maintenance program. The fund was activated in fiscal year 1968, with an initial capitalization of $10 million appropriated by Congress. The ADP fund received an additional $20 million capital under the Supplemental Appropriations Act, dated January 8, 1971 (Public Law 91-665). As a result of transferring excess ADP equipment into the fund at its fair market value, the fund capital has been increased further. As of March 31, 1971, the net worth of the ADP fund was $42 million.

Low funding and decisions of the Comptroller General regarding the utilization of firm multiyear leasing transactions, limit the effectiveness of the fund. We are already planning to make the self-capitalization envisioned in Public Law 89-306 a reality. Our long-range planning contemplates the transfer of all of the Government's general purpose ADP equipment to the fund and the imposition of annual rental charges on users. These charges would provide the capitalization with which GSA will become the central purchaser of the Federal Government's general purpose ADP equipment.

At present, data processing and data transmission fall within separate jurisdictions within GSA. I am not satisfied that this is the best arrangement. That is why, by June 1, 1971, we will award a contract for a study of our present operations and recommendations for their improvement.

I am very interested in this study and I think it will be an important part of our work and will bring about changes in our own policies.

Mr. Chairman, I would be remiss if I failed in my statement to make mention of the problems and possibilities to be faced in the future of ADP procurement. Alternative sources of supply, new procurement methods, system life cycle costing, use of short term leases, firm term multiple year leases, competitive versus sole source determinations—all these demand study in a changing economic and technical environment. You are assured that we shall continue to take actions on a Government-wide basis in order to place and maintain the Government in the most advantageous position in this evolving environment.

Mr. Chairman, this concludes my opening statement. We will be pleased to respond to any questions or comments that you or members of the subcommittee may have.

Mr. BROOKS. Thank you very much, Mr. Administrator.

In the area of procurement, probably your principal responsibility, would you or whichever member of your staff you might wish to call upon, give us a brief description of the procurement process that you presently follow.

Mr. KUNZIG. The present computer procurement system is an adaptation or a refinement of the Federal supply schedule contract used prior to the enactment of Public Law 89-306. Essentially, the Federal supply schedule contract is a backup to the more sophisticated procurement system that has been developed under the act that is concentrated on large, multiple-system procurements where significant savings can be made through extensive negotiation with the vendor of the equipment.

Under the schedule there is a maximum order limitation which automatically triggers a GSA requirement for a delegation of authority to procure equipment above the maximum. Above the maximum, GSA may elect to permit the agency to procure the equipment under a delegation either at the Federal supply schedule contract price, or by separate contract at such better price as the agency may be able to obtain from the vendor; or we may elect to conduct the procurement for the agency. This GSA decision depends primarily upon the availability of resources and the size and complexity of the requirement.

When GSA elects to delegate, we admonish the agency operating under such delegation to obtain the best price possible through whatever competitive leverage the agency might have, considering the equipment they need. In those cases where GSA handles the procurement, the effort is routinely made to meet the agency's requirements at as low a price as possible.

A complete procedure which outlines the process to be followed when GSA procures for an agency has been coordinated with the agencies and is about to be published.

Mr. Brooks. Thank you, Mr. Administrator.

Over the past several years, GSA has notified us of significant cost reductions as between the Federal supply schedule contract price and the negotiated price. These significant reductions indicate that GSA has some good negotiators. Would they not also suggest the possibility that the Federal supply schedule prices are in themselves a little bit excessive?

Mr. Kunzig. Despite the fact, Mr. Chairman, that the Federal supply schedule contracts appear to contain commercial prices, there are cost reductions which have been realized by these contracts due to GSA negotiating more than pure price. Starting with fiscal year 1966 through March 31, 1971, we have realized cost reductions of $172.4 million, or 6.4 percent against a dollar volume of $2.7 billion in the Federal supply schedule contract area. The bulk of the Federal supply schedule dollar volume relates to carry-forward of the purchase, lease, and maintenance of equipment initially procured in years prior to the advent of the maximum order limitation concept.

By contrast, in the separate contract area, cost reductions during the same time amounted to $158.7 million or 28.8 percent against the dollar volume of $392.5 million. In view of the fact that the Government's procurement is about 8 percent of the overall ADPE market volume, in which commercial prices prevail, and the cost reductions we have been able to obtain in Federal supply schedule contracts, the prices, we feel, are not out of line. However, the most favorable discounts achieved in multiple procurements are indicators which will receive consideration in the future price negotiations under the Federal supply schedule contracts.

Mr. Brooks. You think, essentially, that the commercial price is what is reflected primarily in the Federal supply schedule contract.

Mr. Dodson. Yes, Mr. Chairman; we have negotiated hard for quantity discounted prices to appear on the face of the schedule. By and large, the industry has not reacted to those negotiations and this is what, then, led us into the maximum order limitation. It is pegged at a point above which we feel we should receive quantity discounts.

Mr. Brooks. Have you ever been able to acquire an actual sales record on what they have been selling for to other purchasers as distinguished from the commercial price? The commercial price is here, but they sell it to you down here. At what price do they actually sell it to other individuals or corporations? There may be a decided discount. There may just be a list price subject to 10 percent, 20 percent off, 5 percent for cash and 30 percent for pressure and so on. Would you take a look at that, Mr. Dodson? We may not be getting any better deal than the other purchasers.

Mr. Dodson. Yes, sir; I am just not sure.

Mr. Abersfeller. Mr. Chairman, may I address myself to that point? On the Federal supply schedule contracts, we require each vendor to indicate to us what he sells his product for commercially. We also require him to show what he sells his product for to State and local government agencies and others. The objective, of course, is to negotiate a price which is better than he provides anyone else.

The only exception we allow is that we do not hold a cudgel over his head with regard to educational discounts he might give State and local government institutional activities. We don't insist on that kind of price because we don't want to impair the procurement process of those activities. Generally speaking, we get prices which are better than anyone else gets, with that one exception.

Mr. **Brooks**. It would be helpful if we could get an idea what those actual prices were on commercial sales. They may be a little different from those list prices. I just have that feeling.

Mr. **Abersfeller**. We will examine that, Mr. Chairman.

Mr. **Goldwater**. Mr. Chairman.

Mr. **Brooks**. Yes. Congressman Goldwater.

Mr. **Goldwater**. I would like to ask a question. Is the repair and servicing of these machines done in-house, or is this contracted out to industry?

Mr. **Abersfeller**. Most of the repair, Mr. Congressman, is done by contract. We do have some experimental projects going on now, principally in the city of Washington, to determine whether or not the cost of maintenance by the Government would in fact be a cost reduction program. We had a study conducted some time ago by a contracting firm out of Boston which indicated substantial economies would be achieved if the Government did its own maintenance. Additionally, the Comptroller-General completed a study about 2½ years ago which pointed in that same direction. We have not formed a conclusion yet as to whether that in fact would produce the economies that had been earlier reported. It will be 5 or 6 months before we finish our work in the Washington area.

The exception is in strategic locations, the military, the Department of Defense, does a good deal of its own maintenance.

Mr. **Goldwater**. Thank you, Mr. Chairman.

Mr. **Brooks**. Mr. Kunzig, what do you foresee as improvements in computer procurement so that more competitive prices can be obtained on a broader scale?

Mr. **Kunzig**. Generally, Mr. Chairman, we recognize the long-term limitations in the use of Federal supply schedule contracts as they exist today for the procurement of computers. Believing that the entire ADPE Federal supply schedule contract area needed an indepth study, with an eye to modifying the extent to which it is used now, we have recently undertaken such a study. We are investigating ways to group or combine individual procurements into multiple buys, and thus perhaps gain cost reductions similar to those we have realized in the past on multiple procurements.

We shall provide the results of the study to the committee as soon as they are available.

Mr. **Brooks**. What procurement capability must you develop before you can substantially extend your negotiating capacity?

Mr. **Kunzig**. Two elements which could add leverage to our negotiating capability are technical in nature. They are, one, the development of equipment capability standards, and, two, the objective measurements of computer performance.

In our opinion, however, these elements will not be available in the immediate future. In the interim, therefore, we believe that our principal weapon is the expanded use of the central purchaser concept.

To a very great degree, improvements in our procurement will come step by step through broadening and intensifying our present approach and ability so as to include an increasing percentage of the Government's computer procurements. We plan to expand our present capabilities so as to accomplish all multiple system procurements and a substantial number of single system procurements. To achieve our goals in these areas, however, our very limited ADPE procurement staff will need some augmentations.

We have provided for this buildup in our 5-year plan.

Mr. BROOKS. Turning now to sole-sourcing, this subcommittee—and I believe everyone concerned—is troubled by the lack of competition in some facets of computer procurement. Would you give us your analysis of this problem and what GSA is doing about it?

Mr. KUNZIG. We share the concern of the committee, Mr. Chairman. However, when the criteria established by procurement regulations can be met, sole-source must be approved. In a nutshell, this criteria states that it must be clearly evident that the property or the services required can be obtained from only one source or the urgency of the requirement is so overwhelming that it precludes the competitive process.

We believe that this criteria seldom can be met. Both procurement regulations and Office of Management and Budget issuances require a competitive approach——

Mr. BROOKS. Pardon me, Mr. Administrator. That overwhelming urgency seems to occur on a daily basis in the Defense Department, because they seem to sole-source almost as much as you spend.

Go ahead, if you will.

Mr. KUNZIG. Both procurement regulations and Office of Management and Budget issuances require a competitive approach to ADPE procurement unless the sole-source criteria prevails. We have reiterated this policy repeatedly. Our latest guidance as a policy paper formulated by the GSA Ad Hoc Committee on ADPE procurement which has been recommended to the Office of Management and Budget for publication. Directives and guidance notwithstanding, we believe the only effective way for GSA to exercise reasonable control over sole-source procurements is to require that we review and approve all details relating to such proposed procurements.

Since detailed examination in support of the findings and determinations is necessary, additional resources would be required to perform this function. Again our proposed 5-year plan buildup provides for this capability.

Mr. BROOKS. Turning now to alternative methods of procurement, what is the GSA's reaction to the recent report of the Comptroller General on multiyear leasing?

Mr. KUNZIG. The General Services Administration favors multiyear leasing when study indicates that it's the most appropriate mode of acquisition.

However, we recognize as the committee does that such a method must be used with great care since it's possible that outright purchase opportunities may be more economical. In order to make long-term leasing fully available, we are drafting legislation which would authorize GSA through the ADPE revolving fund to contract on a firm multiyear basis without the necessity of obligating the total payments at the time of entering into the lease.

As a result the ADPE fund could be used extensively to obtain the maximum benefits of firm multiyear leasing without a substantial increase in the fund's capitalization.

Generally, we agreed with the report. However, additional resources will be required again to expand the program as specified in the report.

Mr. Brooks. We will be very interested in that legislation when you get some ideas on it, Mr. Kunzig.

Mr. Kunzig. We will keep in constant contact with your staff and you.

Mr. Goldwater. Mr. Chairman.

Mr. Brooks. Mr. Goldwater.

Mr. Goldwater. Mr. Kunzig, is it your intention to create an amendment to Public Law 89–306 to remedy this problem?

Mr. Abersfeller. Mr. Goldwater, it will either take the form of an amendment to Public Law 89–306 or separate legislation. We haven't firmed up yet precisely what form it should take.

Mr. Goldwater. How close are you to this formulation, to bringing an amendment before this committee?

Mr. Abersfeller. It's in its final stages of drafting now and will have to go to the Office of Management and Budget for clearance. There will be certain executive branch clearances and it's difficult to predict the time. We are hopeful of getting it here as early as possible.

Mr. Goldwater. It's a fact that the Brooks Act does limit you to 1 year.

Mr. Abersfeller. It's a fact the Comptroller General's decision requires it. The Brooks Act allows procurement on a multiyear lease basis. The Comptroller General ruled, however, that we had to obligate the total costs at the beginning of that lease. This is what we are trying to overcome.

Mr. Goldwater. And you feel that that legislation is necessary to do that, rather than changing the Comptroller's policy.

Mr. Abersfeller. If the Comptroller General reversed himself, legislation would not be necessary. However, he did recommend in his report that the Congress consider legislation and that is what we are planning to do. We have discussed it with them and from our discussions it does not appear that they are considering reversing themselves.

Mr. Brooks. To clarify that point, the Economy Act under which the Comptroller General is acting requires that special legislation be passed to commit money for more than 1 year. We had some legislation in this committee just recently, and you may recall it, Congressman, on 2- or 3-year contracts for elevator maintenance.

It gave them an opportunity to get a better servicing agreement from the people who did that kind of work and we had to pass a law to allow them to make those multiyear contracts. Multiyear contracts for computer components would seem to offer similar advantages to the Government. However, we are not going to let them use such authority to eliminate purchasing equipment that should be purchased.

If you could lease it for 5 years, or if you could get a 10-year contract for equipment from the Government, you can finance it all. You can buy it on the basis of the Government contract.

Mr. Goldwater. I think it's important that they have as much flexibility as possible to economize wherever possible. In fact, I think it might be interesting for the committee to see certain figures on savings that could be realized by going to multiyear contracts. I wonder if it would be permissible to have the gentleman submit that for the record.

Mr. Brooks. Submit what advantages he might get.

Mr. Goldwater. Economic advantages by utilizing more than 1 year.

Mr. Brooks. Congressman, we will get that information when they submit the legislation, certainly, and they may have it ready now. As to the efficiency and economy with which they procure that, this is a problem we have been dealing with pretty steadily since 1963 and we have been trying to get the attention of the GSA and various administrators under various administrations. They have, I think, reacted rather well, resulting in the savings that Bob Kunzig just indicated of $1.1 billion in the past 5 years as a result of these better management techniques that this subcommittee recommended and insisted upon several years ago.

Mr. Kunzig, the term "Systems life cycle costing" has been used recently in GSA circles relative to computers. Could you provide the subcommittee with an explanation of what this term means and explain its importance?

Mr. Kunzig. "System life cycle costing" relates to determining the total actual dollars that will be expended by the Government in the use of ADPE from the time it's installed until the time it's projected to be discontinued. While varying versions of this concept have been practiced in the past, we have introduced a new and critical factor.

This factor requires vendors to offer firm fixed prices over the life of the system. This does not mean the same price each year but rather a firm fixed price for each year which at the vendor's option may differ from year to year. In addition to considering the price of the equipment, this concept involves the life cycle consideration of other factors when appropriate, such as software, maintenance, site preparation, training, personnel, conversion, cost of money, residual value and all the other aspects of the use of the gear.

The importance of our new policy is twofold. One, it makes the equipment selection and contract award process considerably more precise and, two, it comes much closer to identifying the actual overall Government dollar outlay which will result from the procurement.

Mr. Brooks. What is the GSA doing in the area of multivendor procurement, in other words, breaking up system procurement into component procurement?

Mr. Kunzig. GSA has always fostered the broadest possible base for procuring ADPE. Since 1969 we have put special emphasis on encouraging independent peripheral and accessorial equipment manufacturers to participate in our Federal supply schedule program. As a result, the number of these independent peripheral and accessorial equipment manufacturers with Federal supply schedule contracts has increased from 42 in 1969 to 119 as of March 31, 1971.

Insofar as the replacement of existing leased equipment is concerned, GSA has exercised leadership in coordinating Governmentwide replacement programs. Specifically, GSA and other Government agencies, Veteran's Administration, Navy and DSA, the Defense Supply Agency, operating under delegations of procurement authority from GSA, have awarded $32.9 million in separate contracts to the independent peripheral equipment manufacturers for tape drives and disc drives. These procurements were conducted in accordance with the basic guidance set forth in the Office of Management and Budget Bulletin 70–9.

The contracts referred to represent life cycle cost reductions of $19.4 million. Procurements of newly announced independent peripheral and accessorial equipment manufacturers, printers, memories and terminals, are planned. We are extending this philosophy into the maintenance area. Solicitations relating to multisystem maintenance in the Washington, D.C., and St. Louis, Mo., areas are close to issuance. These solicitations will permit other than original equipment manufacturers to compete.

We are also expanding our use of other than original equipment manufacturer sources so as to meet as much of our punched card accounting machine requirements as possible from other sources. In respect to the initial procurement of an ADPE system on a component-by-component basis, GSA is conducting a test procurement whereby we configured the equipment system and asked vendors to offer against it.

Unfortunately, the independent peripheral and accessorial equipment manufacturers did not participate fully in this effort. We have just about concluded our evaluation of this project. As soon as the results are known we shall pass the data at once to the committee.

Mr. BROOKS. Mr. Culver?

Mr. CULVER. Thank you, Mr. Chairman.

Mr. Chairman, one of the problems that has concerned me with computer use in the Federal Government is that we are neither applying these techniques nor investigating the technological potential to the best advantage.

Of course, as you suggested, we have to develop adequate policies to protect individual privacy and rights. But fundamentally I believe the computer has a tremendous potential as a means of processing information that would help alleviate and eliminate some of our overwhelming social problems in the country today.

It seems to me that the state of our hardware is so much more sophisticated than our software in this area, not only within the executive branch but within Congress itself. I think we all agree the Nation has many problems, particularly in poverty and ignorance, health needs and so forth, that might be susceptible to solution in part through more effective application of computer systems.

However, from the testimony today and from what other information the subcommittee has appeared to acquire in the past, computer usage in the Federal Government appears for the most part to be limited to housekeeping details—payroll, administrative operations, and furniture inventories. Under these circumstances, Mr. Chairman, what I would like to do is ask the witness what suggestions and thoughts he has for the committee as to how we could more fully exploit the very real computer potentiality in the vast area of meeting some of our Nation's agonizing social problems.

Mr. Kunzig. Mr. Dodson, would you like to take that?

Mr. Brooks. Mr. Dodson?

Mr. Dodson. Congressman, GSA is fulfilling its portion of the act by making resources available on a least-cost basis. Therefore, the various agencies with missions in the health and welfare area, the educational area, the housing area, can have access to these resources on a least-cost basis and make the dollar go further.

Actually the Office of Management and Budget publishes annually a summary of the ADP applications achieved and the savings achieved in the advances through ADP technology throughout the entire Government. When the Office of Management and Budget testifies, you might care to ask them about their publication and what they have got on meeting social problems.

Mr. Culver. How well prepared are you today on a substitute basis to give us just a suggestion, some greater degree of understanding, of the application of the computer in substantive program fields along the lines I have suggested, totally independent of your warehouse responsibilities? What are we doing with these things of a vital social importance, if anything?

Mr. Abersfeller. Mr. Culver, let me point out first that GSA's responsibility does not quite go——

Mr. Culver. I appreciate your responsibility but we rarely have this great panoply of sophisticated experts in the computer field before us who have some passing familiarity with conceivably what a computer is doing in the Federal Government. I was just wondering if one of you might be kind enough to give me one example in the area of health, education and welfare, in the fields of housing, jobs, and educational opportunities.

Any little single thing you can think of rather than payroll and charge accounts that would be of passing curiosity to me. I wonder if one of you fellows is bold enough and courageous enough to step across the narrow jurisdictional boundaries that are always so threatening and sobering and, say, yes, we are using it that way and this way and we could do more of this.

Mr. O'Mahoney. We are familiar with some applications. Let us tell you about this, Congressman Culver, we are already working with HEW to choose an agency you have singled out, with a preliminary study on how they may use computers—a preliminary study on how they may use them on man. In the family assistance program that is proposed, we are working with them and are looking at the communications and data processing requirements that the agency is anticipating in the application of computer technology to a new program.

Mr. Brooks. Maybe Mr. Dwight Ink might want to add something on that very subject, other than the nuts and bolts of acquiring it.

Mr. Ink. All right, Mr. Chairman, would you like to do this now or when we testify?

Mr. Brooks. You can do it when you testify if you would like. I would like you to think about that a little bit so we can get a good concise evaluation of what you think is in the ball park.

Mr. Dodson. Through our Federal data processing centers and on a least-cost basis, we are working with HUD on a grant project management system. It's called the HUD-RAMIS system. It's a field system which establishes a project monitorship control over their grant projects. We are informed that for the first time it has given their field and central management a timely knowledge of progress against goals on their grants.

We are working with the State of Washington which has a Department of Labor grant in the employment area. We are running in our Federal data processing center a job bank system which receives daily employment statistics which have been communicated electronically. They are processed daily and transmitted back out to the employment centers within the State of Washington so that they can run their job bank program.

We are also working with the Federal courts. We automated and are operating a Federal court jury selection system. Under recent rulings, the entire population of eligible jury members must be considered in the jury panels. This volume exceeded the normal manual means in certain judicial districts of assembling and selecting jury panels. We are running a jury selection system for the Federal courts, which permits all eligible jurors to be considered for random panel selection.

These are three examples of the varied social involvement applications running through our data systems.

Mr. Culver. Thank you.

Mr. Chairman, in addition to the areas which you have so properly directed the subcommittee into, I hope in the future we can also turn our attention to the question of computer use and the extent to which our employment of the state of the art in the area of these social fields is really at all apace with the potentiality of what is already being undertaken and done in many areas of the private sector in addressing themselves to these problems.

I think the average American wants to see computers constructively applied to help eliminate these social problems without violating his privacy and confusing his charge accounts. I serve on the Foreign Affairs Committee and I can assure you that the fellows in the Pentagon are using these computers. It seems to me that we have a weapon here that we are not using.

These pathetic pilot projects, as far as I am concerned, are an embarrassing example of the priorities of the Nation that we don't turn this massive technological capacity to more serious and intensive use in this area of unmet social needs.

I hope we see a greater sense of urgency within the Federal Government toward this end.

Mr. Brooks. Mr. Buchanan.

Mr. Buchanan. Thank you, Mr. Chairman.

I understand the limitations of GSA's responsibility and role here but I would echo this much. It would appear to me that while I find your examples encouraging rather than otherwise, here in Congress perhaps not enough of us understand the full capabilities of ADP and what you can get out of a computer.

I wonder if the same thing might not be true in the agencies. To the extent that you have this responsibility it would seem to me well if you would do anything you can to assist in making clear to responsible people in the agencies using them the capabilities of a computer in working with these things.

It would appear to me that often in the Federal Establishment we have tended to use a computer as we might use a very gifted person to do stenographic work. I, therefore, am glad the gentleman brought up this subject. It would seem, Mr. Chairman, to be very much in order that everyone who has such responsibility, including GSA, should do everything in their power to see that people in the agencies using this sophisticated equipment understand the full capabilities of the equipment and are getting maximum efficient use out of this high-priced equipment.

Mr. Abersfeller. Mr. Congressman, we have no training courses per se in that sense, but we do have an ad hoc committee which has existed for several years now, in fact, since the passage of the Brooks bill, in which we have participation from all the major Government agencies and all the users. There is a high degree of capability within the Federal Establishment and all major agencies have appointed very principal officers of their organizations to head up their ADP activities.

There are extensive training courses available of which we all avail ourselves, either in the private sector of the economy or in some Government-related activity. I simply point out that GSA does not in itself conduct that kind of training. But there is a great awareness of the points that you and Congressman Culver have raised.

Unfortunately within the framework of our responsibility—and we are not trying to duck this question—we are mindful of the sort of things that agencies are doing but we don't have a total list and inventory of those things.

Mr. Buchanan. I am delighted that you have been able to give us these examples and I hope you can develop your potentiality toward the full and efficient use of whatever capability the computer has.

Mr. Abersfeller. We certainly shall.

Mr. Goldwater. Mr. Kunzig, in your statement you mentioned that areas of responsibility of GSA include not only procurement but resource utilization. This, of course, must involve the concepts of allocation and equipment use based on certain priorities.

As a consequence, you must get involved with the substance of major legislation and major policy goals of various Government agencies. The question is, how do you establish those priorities. If HEW and HUD have projects, do you have the responsibility of saying, "Yes, HUD, you can have so much time and HEW, you can have so much time"?

How do you arrive at a decision as to what those projects are?

Mr. Brooks. Mr. Kunzig, before you get into that, that problem was worked on before you came down here. You were still campaigning for that other party in Pennsylvania when we worked on that.

Actually, Mr. Goldwater, this problem of priority and allocation of capacity, computer capacity, to various Government agencies and departments lies not with the GSA at all but within the agencies. The GSA under that legislation and under the concept that the Government has been following for some time is not to have a centralized determination of what areas the various departments could go into.

If I had been for that and if I had tried to put it into legislation, it would have been defeated. The individual agencies and departments have the authority to determine their own programs as laid out by Congress.

Mr. **Goldwater.** I think we can appreciate that, Mr. Chairman, but they are requesting more money for additional computers because they don't have enough now to handle the workload that is requested. As such if there is a scarcity of computers available, somebody has to make that determination.

Mr. **Brooks.** I think the idea is probably good but what their responsibility is, together with their resources, is using the computer they have in sharing them and using them 10 hours a day or 24. That is the kind of resource utilization they are talking about that they analyze within their own organization and within agencies, not really what they are doing with the computers.

They didn't appoint Bob Kunzig to run the Defense Department and the HEW and all these other agencies. If they have anything other than a suggestion as to an interest, if they had any real input into what they are doing and real authority to interfere in substantive programs, the next Cabinet meeting would look like the DMZ on a bad day.

Mr. **Goldwater.** I believe this is a matter of priorities. If there is a demand for 10,000 hours and you only have a thousand hours available and GSA has the responsibility for resource utilization, who makes the decision as to where that thousand hours goes?

Mr. **Brooks.** The Congress of the United States and the Office of Management and Budget would make that decision in allocating moneys for the procurement of electronic data processing equipment to HEW and other agencies. If they authorized them on the basis of priority, if Congress decided and OMB agreed they had the authorization for the equipment. They would then work on Bob Kunzig and his staff to acquire the equipment, not to determine the purpose for which it will be used.

They just don't have that authority.

I would leave him on the hook and let him dangle a little bit, but it's really not his business. It's not very often I defend those people in that other party, particularly from themselves.

Mr. **Goldwater.** On the other hand, I suppose it's not their responsibility, then, to respond to Mr. Culver's question also?

Mr. **Brooks.** Technically they would have no real authority as to how HEW is going to use. But, as responsible bureaucrats they want to cooperate with other bureaucrats in their problems and in their efforts to solve pressing problems in the country. They have some expertise in equipment.

They don't have any authority in the matter but they do have an advisory committee and they do have a willingness to discuss whatever they think might be helpful. Their recommendations would be advisory as far as the actual use to which another agency or department is going to put the equipment.

Abbie, is that the way you have been operating all these years? You are quitting and you can feel free to say so, if it's not.

Mr. Abersfeller. Everything you have said is accurate. I simply want to add this point of clarification which repeats in many ways what the chairman has said. Our responsibilities are restricted to one of managing the resources which are available, and that was part of the administrator's opening statement that you referred to, Congressman Goldwater.

In that effort we have no authority to question an agency's requirement. If, indeed, the Congress in its wisdom appropriates moneys to an agency to accomplish a certain function, we don't sit back and second guess that. However, we do get reports on the available type of equipment. All equipment is not used 100 percent of the time.

We have a right in the bill, and authority in the bill, and in fact, the chairman has admonished us many times, to see to it that those resources that are available are used to the maximum possible extent. That is what we intended to say.

In other words, an agency will say, "I need to do a certain job." That is a decision we do not question. How that job is to be done is our responsibility. Either we will buy equipment for them or we will ask them to use the Department of Defense's computer system if there is available time.

Mr. Kunzig. Mr. Chairman, may I just for 1 second go back to what Mr. Culver was talking about? I think we can, and with your permission will, address a letter to the various appropriate secretaries and heads of agencies discussing with them what was brought up here, I think, in very interesting fashion by the committee this morning, and second, perhaps in the very near future have an overall meeting on the general subject with appropriate people from other agencies.

The rest depends, as did the last subject that we are talking about, on the Secretaries themselves, the funds available and the way they have the responsibility to conduct their own departments. We still move further along this line and bring it to their attention.

Mr. Brooks. Thank you, Mr. Kunzig.

On the matter of sharing, there have been some charges that certain agencies have over procured equipment and in effect have gone into the computer service center business. I think the Department of Agriculture was mentioned. What is your reaction to this?

Mr. Kunzig. These allegations appeared in an Electric News article concerning data processing centers operated by NIH, HEW, and Agriculture. We have found that NIH provides less than 3 percent of its machine time to the other agencies through the sharing program.

This 3 percent should be correctly termed "Sharing excess machine time." NIH is not in the service center business. We are working with HEW in order that the Data Management Center, Office of the Secretary, may be delegated authority to operate as a Federal data processing center. Agriculture provides approximately 25 percent of its machine time to other agencies. We are obtaining additional information on this matter and when received and analyzed we will advise the subcommittee.

We have completed a nationwide study of other agency centers and have found that none do excessive work for other agencies or use this workload or reimbursements therefrom to obtain ADPE capacity beyond that needed for their own work.

GSA's position is to encourage the establishment of consolidated agency centers. However, when such centers are augmented to provide services for other agencies, they should become Federal data processing centers.

The FDPC's can only be operated by a delegation of authority from GSA with due consideration given to cost analysis of available alternatives, including use of the ADP fund.

Mr. Brooks. On several occasions we have checked to determine the availability of excess equipment and found there is seldom any modern equipment available. How do you explain this?

Mr. Kunzig. When modern Government-owned equipment is no longer needed for the purpose for which acquired, agencies will reutilize the equipment to meet other requirements or to replace leased equipment and thereby avoid rental payments. Thus, the internal reutilization actions are effected by agencies, which is the main reason why modern Government-owned ADPE is not declared excess to agency needs and available in the GSA reutilization program.

A secondary reason is that under GSA's basic legislation, agencies are permitted to sell or trade in installed owned equipment on new equipment under the exchange-sale program. This practice will be reviewed for possible discontinuance if it is determined that it defeats the ADP fund self-capitalization.

Mr. Brooks. Do I understand then that the agencies can just trade in equipment that might have considerable additional life in it on a basis that they agree with, with the manufacturer?

Mr. Dodson. When they qualify under the Federal property management regulations under the exchange-sale provisions they may do so.

Mr. Brooks. Does the GSA take a look at that? Does that have to come through you? It seems to be that there is a little gate in controlling that equipment and getting the fullest utilization out of that cost.

Mr. Dodson. At this time, under the Federal property management regulations, Mr. Chairman, when an agency, with regard to ADP equipment, has elected to pursue the exchange-sale provisions, the only requirement is that they notify GSA of that decision, of the availability of the equipment, and the best price they think they could get for the equipment, which is normally fair market value. We attempt to redistribute it at that price.

Mr. Brooks. Maybe we ought to take a closer look at that. I think that has a potential for some losses to the Government.

Mr. Kunzig. This is one of the points I think we suggested we will take a look at, sir. We shall.

Mr. Brooks. I have one example of the Defense Department in which we are interested. At the Barstow marine supply center, they have it set up with a 360, as I recall. They are using it very successfully and they are happy with it.

It handles the main load of processing supplies out of Barstow, Calif., for their South Pacific and Vietnam operations. In addition, they have an old 1401 sitting they are still cranking along. I asked them, "What are you doing with that"? They said, "Well, we use it about 50 percent of the time. It is paid for and amortized and we are getting 50-percent use out of it now and it meets a need for us and we are happy with it." They process their payroll and some similar things on it. It is pretty good utilization and they are as happy as pigs using that equipment.

So agencies in the Government, and many in the Defense Department, I am sure, would have put in a request for another 360. Some progress is being made.

In connection with our management information system relating to our computer inventory, do we have a constantly updated system as yet, and if not, why not?

Mr. **Kunzig.** GSA presently has a constantly updated ADP management information system which provides for reporting systems gains and losses as they occur. However, certain built-in operating restrictions within the ADP management information system tend to negate the concept of a total constantly updated data base.

For example, the following actions occurred this past year. Across the board fiscal year 1970 inventory was finalized August 10, 1970, and the volume I inventory document was published August 29, 1970.

Second, editing and corrections of the total fiscal year 1970 file, including all manpower and cost data, were not finalized until January 25, 1971. During the interim, August 10, 1970, to January 25, 1971, gains and losses to the inventory document were not processed. This was necessary to fulfill the requirement that all interrelated computer counts and appropriate data between the two volumes would exactly match.

Third, the present file includes all gains and losses received through April 29, 1971, and no other updating has been received since. On May 13, 1971, OMB directed that agencies are no longer required to report gains and losses in the present ADP management information system. Resources are to be utilized to the fullest extent to implement the revised ADP management information system as of June 30, 1971.

In conjunction with the OMB and the Federal agencies participating in the ADP Management Information System, the following actions have been taken as a part of the revised system to provide for a more workable, constantly updated system at the component level.

These actions provide for, first, inclusion of machine serial numbers; second, emphasis on availability of current data in conjunction with data quality; third, standardized editing routines among all agencies; next complete inventory file reporting on a perpetual basis for all equipment as it occurs, eliminating the concept of "holding" data until the complete file is replaced. Next, producing a finalized file at regularly scheduled times with routinely produced status reports identifying error deletions from the file for management followup. Next, producing future reports based upon the updated file data as of the publication date which will include all acceptable updates submitted by agencies.

Mr. **Brooks.** Do you think one ought to be that the OMB should forthrightly require all agencies to promptly report these machine inventories to the GSA without any further delay on a week-to-week basis and do it without squabbling and all of that hokum with filling it out and waiting? That is a hard way to get a list of how much equipment they have got and what they are doing with it. Apparently somebody is dragging their feet. You don't mind getting the equipment report, do you, Bob?

Mr. **Kunzig.** No; we have no objection.

Mr. **Brooks.** Is there a little difficulty in acquiring it?

Mr. **Kunzig.** I guess that was the point.

Mr. **Brooks.** I see Mr. Ink over there and we will mention that to him. You are willing to receive it at any time?

Mr. **Spangler.** Saturday, Sunday, or at midnight.

(Answers to additional questions follow:)

Question. Could you tell us of your reutilization program?

Answer. When, after internal screening, an agency determines that it no longer has a need for ADPE, it is reported to GSA as excess personal property. GSA then advertises the ADPE in order to determine if there are other Federal requirements for it. In this process excess ADPE is compared against agency procurement requests to avoid new procurements and installed leased ADPE in order to reduce rental payments or preserve rental credits where possible. If there is a need, the ADPE is transferred to an agency. If there is no agency need, the owned ADPE is released as surplus property and leased ADPE is returned to the vendor. As indicated in my statement, a cost reduction of $448.8 million at acquisition cost has been achieved during the period November 1965–March 1971, throught the reutilization of excess owned ADPE, including Department of Defense interservice transfers. During fiscal year 1970 reutilization of excess owned ADPE resulted in a cost reduction of $113.1 million, an increase of 65 percent over fiscal year 1969. Two examples of reutilization follow:

(*a*) An owned IBM 1620 computer was reutilized by the Portsmouth Naval Shipyard, Portsmouth, N.H., to replace a leased computer. This resulted in a rental savings of $4.924 per month or $177,264 over the 3-year period.

(*b*) GSA gathered 33 components from nine different locations across the country to provide the U.S. Postal Service with IBM 1410, 1401, and 7010 systems in order to meet postal operating requirements at Boston, Mass., New York, N.Y., and Topeka, Kans. This resulted in a cost reduction of $2,446,000 at acquisition cost.

Question. What about sharing? What are we doing in this area?

Answer. The ADP sharing program is concerned with that portion of existing ADP machine time or manpower which is excess to agencies requirements at a particular point in time. For example, 2 hours of machine time available on a computer today, if not used, will be gone or wasted. The sharing program considers this time-dependent availability of resources as excess and a first source of supply in order to avoid waste. As indicated in my statement, a cost reduction of $250.8 million has been achieved beginning in fiscal year 1966 through fiscal year 1970 by the sharing of resources. In fiscal year 1970 a cost reduction of $86 million was achieved. Two examples of resource sharing are as follows:

(*a*) GSA assisted the Navy's Antisubmarine Office, Washington, D.C., in making arrangements to obtain 400 hours of CDC 6500 computer time from the Naval Weather Service, in Monterey, Calif. This sharing resulted in a reduced cost of over $200,000.

(*b*) The Environmental Science Services Administration at Boulder, Colo., provided 500 hours of CDC 3800 time to 23 different Government activities which resulted in reduced cost of $67,146.

A major development in this program during the past year has been the publication of FPMR Bulletin E–91. This regulation eliminates the previous "ad hoc" nature of the sharing program by requiring agencies to receive written determination from GSA that sharing resources are not available and authorizing the use of commercial sources.

Question. What have you done in the way of establishing data centers?

Answer. There are presently 12 GSA Federal data processing centers (FDPC's) in operation which provide centralized data processing services to Federal agencies. GSA data processing services to other agencies has increased from $74,000 in fiscal year 1966 to an estimated $2,500,000 in fiscal year 1971. It is anticipated, within the 6-year period fiscal year 1972 through 1977 that eight new FDPC's will be established and that data processing services to other agencies will increase to $33 million. The new FDPC's are planned to include a simulation center which will translate user operational requirements into meaningful ADP equipment requirements; and a COBOL validation center to validate COBOL compilers for ADP (qualified products procurement listings). These centers may be operated by other Federal agencies. During fiscal year 1971, data processing services have been provided to 39 other Federal agencies. Our plans provide for a time phased approach to establish FDPC's as a primary source of supply for certain computational requirements, thus avoiding potential proliferation of poor cost/performance ADP installations and individual single agency procurements at higher costs. Since a potentially large part of these type requirements may be able to be met by remote access to large computers located distant from the user, a communication multiplex system will be used. Communication multiplexing, which is the vehicle producing low transmission costs associated with Project RAMUS, will be installed and be the centrally managed communication system for all FDPC's.

Project RAMUS is an acromym for Remote Access Multi-User System. It is a system whereby many users can use the same computer simultaneously from remote locations over communications lines.

We started this service on February 9, 1970, at the Atlanta Federal Data Processing Center. It now serves 80 separate Governent activities in 27 States and the District of Columbia. The terminals are teletype-like devices and more than 150 of them are connected to the system. Up to 49 terminals can be in simultaneous use during the period 8 a.m. to 5 p.m. During the rest of the day, the computer is used for the normal data processing center programs.

The service we provide is known as interactive or conversational time-sharing. It is characterized by its small scale jobs which are mostly computational. The user does his own programing and the computer responds directly and immediately to him. The principal advantages of this type of computer usage are in the time which is saved by having immediate access to and response from the computer; in cost, by charging the user only for the time he is actually using the computer; and in the accessibility of the service. All that is required to access this service with the terminal is a telephone and a common electric outlet.

Most of the communication is over a GSA dedicated network using multiplexers which divide up a voice grade telephone circuit into many low speed data channels. But the computer can be accessed over any telephone line.

Question. Regarding the data processing revolving fund, what have you been using it for, what are the problems that you are having with it, and what restraints limit its effectiveness in your opinion?

Answer. The ADP fund is currently used to finance four distinct program areas:

1. *The lease program.*—In this program the fund acquires ADP equipment by excess transfer, purchase, or lease and leases it to Government users at rates which are lower than those available from any other source. By excess transfer and purchase, the fund has acquired equipment capitalized at a fair market value in excess of $12 million, by a cash outlay of $9 million, with a cost avoidance to the Government of $7.5 million, considering the cost of money.

2. *Software program.*—The costs of developing four broad general software packages have been capitalized at a total value of approximately $1 million. For example, a payroll system has been acquired. This payroll system is being offered to all Federal agencies in a choice of services ranging from simply providing the application software itself to an agency, to providing a complete payroll service including clerical and machine operations.

3. *In-house maintenance program.*—At the present time this is a pilot project in which GSA is providing maintenance services for four Government-owned computers in the Washington, D.C. Federal Data Processing Center. Based on this test, a decision to expand the inhouse service will be made.

4. *Operation of Federal Data Processing Centers.*—We have previously discussed this operation.

With regard to the problem we have had with the fund, in my statement I indicated the fund currently has a net worth of $42 million. Of this amount, approximately $26 million is available for investment. At this time, we have responsive special time limited investment offers inhouse which exceed the available cash.

We have experienced restraints on the fund. Statutory limitations as interpreted by the Comptroller General, regarding the necessity for obligating total amounts in firm multiyear lease transactions has limited its effectiveness for that purpose. We are presently drafting legislation which would resolve this restraint. Pursuant to Office of Management and Budget fund policy the ADP fund has acquired ADP equipment for the lease program only in those instances where GSA identifies targets of opportunity as they occur and the Government agencies have not had an opportunity to follow normal budget practices. General Accounting Office in a recent audit report, recommended that the ADP fund should be more widely used for buying or leasing ADP equipment for use by other Government agencies. Staff capability has had a restraining impact on our efforts.

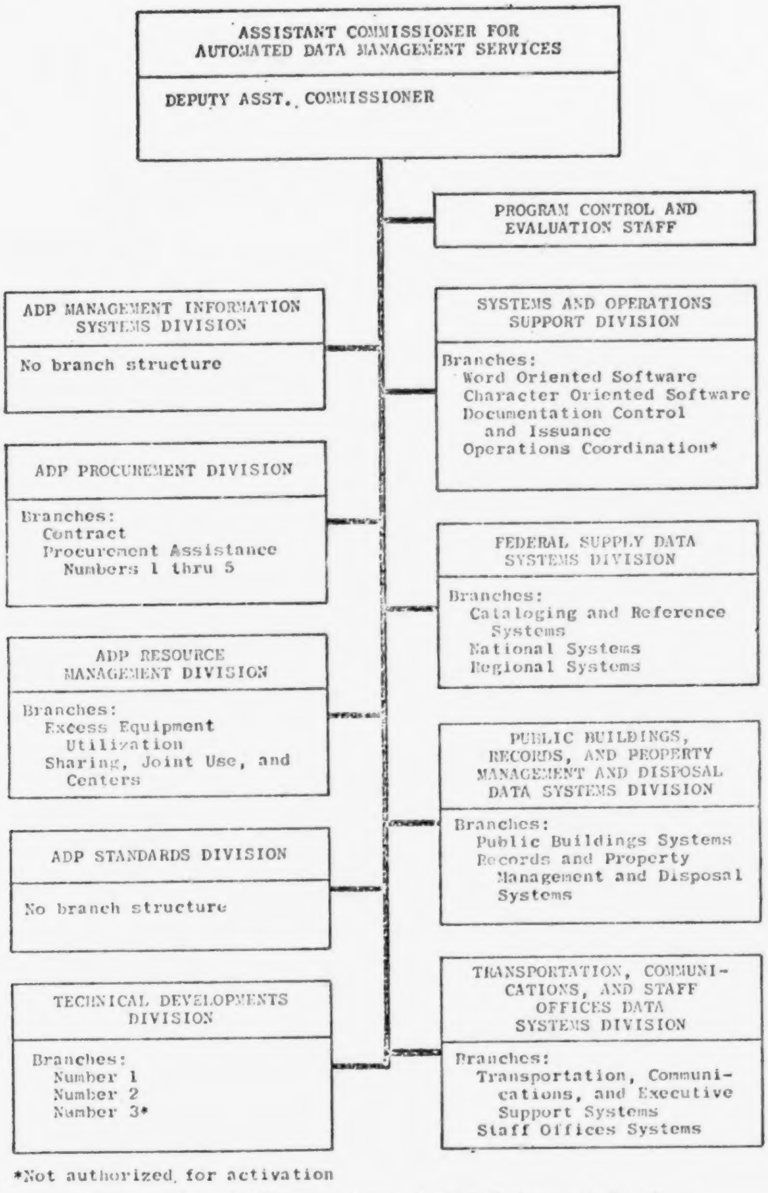
Question. When do you contemplate full capitalization of the revolving fund by the transfer of our general purpose computer equipment into it?

Answer. Full capitalization, that is the transfer of all leased and owned general purpose ADP equipment in the Government to the fund, will be accomplished at such time as when, in my opinion, the management capability has reached a level where such action would make it a definite advantage to do so. This, obviously, will be a major undertaking. While we have not set a firm date for full capitalization, we fully expect that it will be done within the current planning cycle.

Question. Would you provide us for the record an organizational structure of the GSA as it relates to computer management?

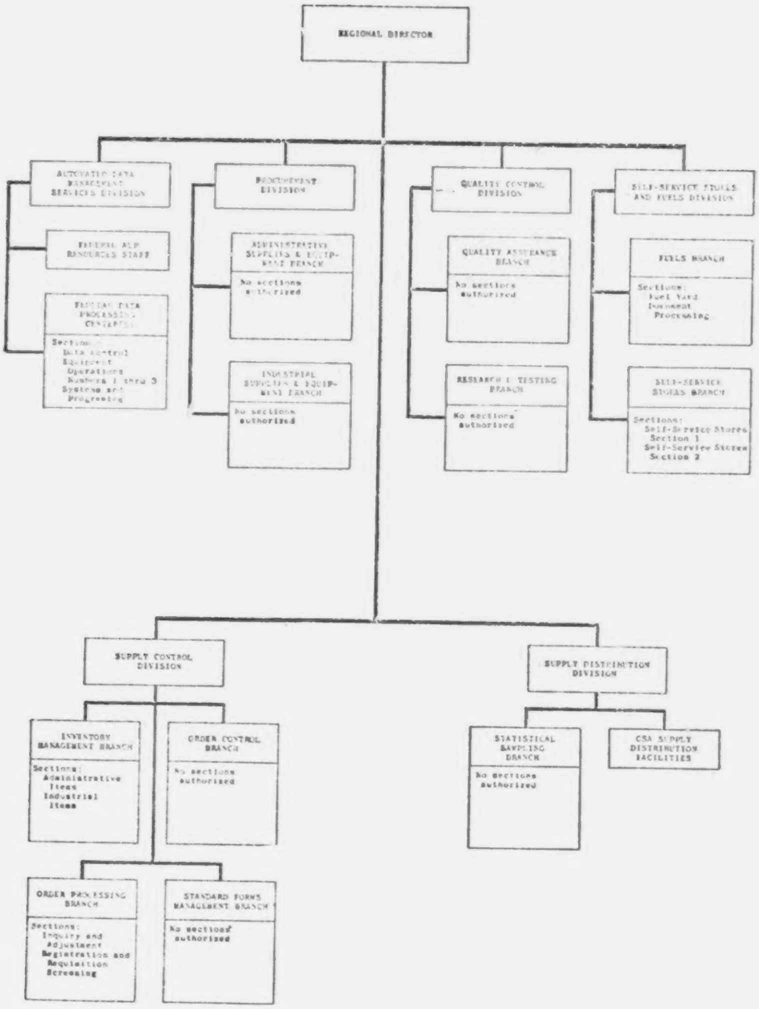
Answer. GSA ADP management is focused in the Office Automated Data Management Services of the Federal Supply Service, however, ADP related functions are presently performed by other components of the Federal Supply Service and other services and staff offices. These decentralized ADP functions include magnetic tape procurement, magnetic surfaces, qualified products testing, data communications, ADP site preparation and protection, and source data automation [illegible]

The office [illegible]omated data management services organizational structure is provided for [illegible] record.


ASSISTANT COMMISSIONER FOR AUTOMATED DATA MANAGEMENT SERVICES
DEPUTY ASST. COMMISSIONER
PROGRAM CONTROL AND EVALUATION STAFF
ADP MANAGEMENT INFORMATION SYSTEMS DIVISION
No branch structure
SYSTEMS AND OPERATIONS SUPPORT DIVISION
Branches: Word Oriented Software
Character Oriented Software
Documentation Control and Issuance
Operations Coordination*
ADP PROCUREMENT DIVISION
Branches: Contract
Procurement Assistance Numbers 1 thru 5
FEDERAL SUPPLY DATA SYSTEMS DIVISION
Branches: Cataloging and Reference Systems
National Systems
Regional Systems
ADP RESOURCE MANAGEMENT DIVISION
Branches: Excess Equipment Utilization
Sharing, Joint Use, and Centers
PUBLIC BUILDINGS, RECORDS, AND PROPERTY MANAGEMENT AND DISPOSAL DATA SYSTEMS DIVISION
Branches: Public Buildings Systems
Records and Property Management and Disposal Systems
ADP STANDARDS DIVISION
No branch structure
TECHNICAL DEVELOPMENTS DIVISION
Branches: Number 1
Number 2
Number 3*
TRANSPORTATION, COMMUNICATIONS, AND STAFF OFFICES DATA SYSTEMS DIVISION
Branches: Transportation, Communications, and Executive Support Systems
Staff Offices Systems

*Not authorized for activation

Figure 6-23. Office of Automated Data Management Services


REGIONAL DIRECTOR
AUTOMATED DATA MANAGEMENT SERVICES DIVISION
FEDERAL ADP RESOURCES STAFF
FEDERAL DATA PROCESSING CENTER(S)
Sections: Data Control, Equipment Operations Numbers 1 thru 3, Systems and Programming
PROCUREMENT DIVISION
ADMINISTRATIVE SUPPLIES & EQUIPMENT BRANCH
No sections authorized
INDUSTRIAL SUPPLIES & EQUIPMENT BRANCH
No sections authorized
QUALITY CONTROL DIVISION
QUALITY ASSURANCE BRANCH
No sections authorized
RESEARCH & TESTING BRANCH
No sections authorized
SELF-SERVICE STORES AND FUELS DIVISION
FUELS BRANCH
Sections: Fuel Yard, Document Processing
SELF-SERVICE STORES BRANCH
Sections: Self-Service Stores Section 1, Self-Service Stores Section 2
SUPPLY CONTROL DIVISION
INVENTORY MANAGEMENT BRANCH
Sections: Administrative Items, Industrial Items
ORDER CONTROL BRANCH
No sections authorized
ORDER PROCESSING BRANCH
Sections: Inquiry and Adjustment, Registration and Requisition Screening
STANDARD FORMS MANAGEMENT BRANCH
No sections authorized
SUPPLY DISTRIBUTION DIVISION
STATISTICAL SAMPLING BRANCH
No sections authorized
GSA SUPPLY DISTRIBUTION FACILITIES

Question. In this connection do you contemplate any changes in the overall management structure?

Answer. Mr. Chairman, I do contemplate changes in the overall management structure. I do not at this time, however, know what these are nor would I want to prejudge the findings and recommendations which will be forthcoming from the contract that I indicated would be awarded by June 1, 1971.

My aim is to have an indepth evaluation made of our Government-wide, internal and related automatic data processing equipment activities, part of which are now performed by separate organizational elements. I expect to have recommendations designed to improve on how we are now conducting our business and will then be in a better position to make changes which would provide for the optimum arrangement.

Question. What must the average agency do in order to acquire computer equipment under the present procurement process?

Answer. While it is difficult to establish a firm chronology of events leading to the acquisition of computer equipment, the following are the major segments of the procurement process:

1. Feasibility study—This analyzes the problem and determines the overall soundness of applying ADPE to the problem.

2. Systems study—This validates the old system or redesigns it to meet management's requirements in light of existing technical capability.

3. Development of data systems specifications—This dovetails and can be considered a part of the systems study, but is technically ADP oriented as opposed to management oriented.

4. Solicitation development—This puts the systems specifications in a form useable by the ADPE industry, develops the benchmark, if one is to be used, adds the business portion tailored to the procurement at hand, and issues the document.

5. Equipment (proposal) evaluation—This phase evaluates all facets of the proposal, technical as well as business. It validates the technical portion by benchmarking.

6. Contract negotiation—This phase develops contracts with all responsive vendors in the zone of consideration.

7. Proposal costing—Using the Systems Life Cycle method, this phase costs all proposals to determins equipment selection.

8. Contract award.

Sharing availability and utilization of excess Government-owned or leased equipment must be considered throughout the process.

Question. What can be done about the extented selection system that takes months and is so costly to both the Government and the vendors?

Answer. The selection system is lengthy and costly, however, a brief review of why and how it came into being is necessary prior to talking to what can be done about it. The current selection system is an outgrowth of a much earlier system (1950s to early 1960s). During this early period ADPE systems were procured, for the most part, in a shorter time frame. To a very large extent ADPE technical and management personnel were almost the sole determiners of the systems to be procured.

In many instances equipments were brought on board which did not perform as originally contemplated and contractual terms and conditions, particularly price and cost factors, did not receive the maximum consideration they deserved. With advances in the state of the art producing larger and more complex ADP systems, it became necessary to modify and strengthen the selection procurement process. This led to the extensive use of benchmark procedures, procurement and contracting and financial personnel taking a more active role, and more definitive data systems specifications based upon which vendors' proposed configurations and prices. These factors which were designed to maximize the Government's receiving optimum systems while at the same time permitting vendors to validly present their offers is time consuming and costly. It also provided for maximum competition.

In addition, the establishment within larger agencies of central ADPE management staffs to review and control expenditures in the ADPE area and the levels of review that became necessary also served to extend the process.

While the extended selection system has benefits, we do feel that the time frame can be shortened. The data specification, management review and other such factors within the agencies which in our opinion contribute to more than 50 percent of the extended process needs to be examined. This is an agency management responsibility. We in GSA are working on the development of a standard contractual clause handbook, standard requests for proposals, and in certain other areas of the procurement process, which we feel will shorten the cycle. There are also other possibilities which may lead toward shortening the selection process. These include the proposed establishment of the Simulation Center and the COBOL Validation Center. In conclusion—we must find ways and means of improving the selection and procurement process while still maintaining the benefits which we feel have accrued by the more stringent and businesslike procedures in the current procurement and selection system.

Mr. BROOKS. Mr. Administrator, I want to thank you and your staff for coming down.

Mr. ABERSFELLER. Mr. Chairman, I want to tell you how appreciative I am for the very kind remarks you made about me at the beginning. I am leaving, so obviously I am not influencing you in any way. I have appeared before you now for 7 years.

I must tell you that you conduct the finest hearings conducted in the Congress and I am deeply appreciative and proud to have been able to participate in them. Thank you very much.

Mr. BROOKS. You are very kind. Thank you.

Our next witness represents the Office of Management and Budget. With us today is Dwight A. Ink, Assistant Director for Organization and Management Systems, accompanied by our old friend, Joseph Cunningham, who heads up the Government-wide data processing management effort in the Office of Management and Budget. He is also accompanied by Clark R. Renninger, Assistant Chief, ADP Management Staff, Office of Management and Budget.

Do you have an opening statement?

Mr. INK. I have an opening statement. It is up to the committee whether you want me to read it or file it for the record or summarize some of the most important points.

Mr. BROOKS. We would like to hear your statement.

STATEMENT OF DWIGHT A. INK, ASSISTANT DIRECTOR, ORGANIZATION AND MANAGEMENT SYSTEMS DIVISION, OFFICE OF MANAGEMENT AND BUDGET; ACCOMPANIED BY JOSEPH F. CUNNINGHAM, CHIEF, ADP AND PROPERTY AND SUPPLY MANAGEMENT BRANCH; AND CLARK R. RENNINGER, ASSISTANT CHIEF, ADP MANAGEMENT STAFF

Mr. INK. Mr. Chairman and members of the subcommittee, we are pleased to have this opportunity to report to you on the progress being made in the implementation of Public Law 89-306 which grew out of the strong interest of this subcommittee, particularly its chairman, and the major issues that confront us in our efforts to improve the management and use of ADP in the Federal Government.

It is my purpose to provide a general overview of this subject with the participation of Joe Cunningham who has provided strong and effective leadership in the administration of Public Law 89-306.

Representatives of the General Services Administration and the National Bureau of Standards will discuss in more detail some of the important matters that relate to their specific areas of responsibility.

In order to provide a perspective for this hearing I would first like to cite a few indications of the magnitude and composition of the Federal Government's ADP program.

On June 30, 1971, there will be about 5,400 computers in use by 44 Federal agencies. Approximately 88 percent of these are concentrated in the Department of Defense, National Aeronautics and Space Administration, and Atomic Energy Commission, although Departments like Treasury, Health, Education, and Welfare, Transportation, and Commerce are also major users of this technology.

One-third of the computers, about 1,950, are considered to be in a special management category because they are embedded within a larger equipment complex such as a satellite tracking system or an industrial control process, or are otherwise dedicated to some unique purpose and are, therefore, not susceptible to all of the management policies that apply to the 3,450 computers in the general management category.

The subcommittee will be interested in knowing that our percentage of Government-owned equipment has increased substantially. About 64 percent of the computers have been purchased, which compares to 58 percent in 1967, and 21 percent in 1963 when the Congress was giving consideration to the legislation which was enacted as Public Law 89–306 in 1965.

We estimate that approximately $400 million in annual rental costs are being avoided as the result of increased purchasing since 1963.

Another point of interest is the pattern of distribution of our inventory according to supplier. Our computers are furnished to us by more than 45 different suppliers. IBM is a major supplier with 26.5 percent, UNIVAC supplies 19.2 percent, Digital Equipment 9.5 percent, CDC 7.7 percent, Honeywell 7.3 percent, NCR 6.1 percent, Xerox Data Systems 4.3 percent, Burroughs 3.9 percent, and RCA 3.5 percent. All other suppliers account for 12 percent.

We believe these figures reflect the basic competitive policies which the Government has built into its selection and procurement processes.

As the subcommittee well knows, computer resources are not inexpensive. In fiscal year 1970 the Federal Government spent $2.1 billion for the purchase and rental of computer systems in the general management category and for the salaries, supplies, and other costs necessary to operate these systems.

The major purpose of Public Law 89–306, of course, is to provide the means for managing these resources efficiently and economically. I believe you will find substantial evidence throughout these hearings that the legislative objectives are being pursued and that tangible results are being achieved.

We believe that Public Law 89–306 continues to provide an effective organizational framework for managing the ADP resources of the Federal Government.

Under the act, the operating agencies bear the primary responsibility for determining how computer technology can best assist them in carrying out their programs and for selecting the types of equipment best suited to their needs.

Three central management agencies—Office of Management and Budget, General Services Administration, and National Bureau of Standards—are assigned responsibility for certain Government-wide functions which are intended to make it possible for the operating agencies to obtain and operate their equipment efficiently and economically.

The GSA procedures—or delegates procurement of—equipment for the agencies, provides data processing services to agencies upon request, arranges the sharing of facilities among agencies, and provides for the redistribution and disposal of excess or surplus equipment.

The National Bureau of Standards provides technical assistance to the agencies, sponsors and monitors research and development activities in computer sciences, and leads the Government's efforts to establish ADP standards.

We, in the Office of Management and Budget, provide overall fiscal and policy control over the implementation of the legislation.

As a general observation, I believe that Public Law 89–306 has significantly improved our capability to manage our ADP resources effectively. But I would not wish to leave the impression that all of our problems have disappeared.

The improvement of computer management is evolutionary and involves consideration of a number of complex issues that are not subject to easy resolution.

For example, changes within the computer industry and its related technology are having a significant impact upon our overall management problem.

Certainly one of the most important developments within the computer industry has been the emergence of a number of subindustries, each of which provides us with a specialized product line.

This opportunity for specialization is a natural evolution in an industry whose gross annual business has grown to over $5 billion in less than two decades.

For years we had been dealing with an industry in which, for the most part, a system supplier such as UNIVAC, RCA, or Honeywell offered a total computer system package consisting of hardware, software, maintenance and training at a single price.

Today, because of volume considerations and the ability to specialize, each of the system elements now represents a subindustry in itself which offers its specialty products such as magnetic tape drivers, storage devices, and software packages directly to the customer in direct competition with the system supplier.

This change presents opportunities to us in the form of lower prices and higher quality products. It also presents some serious managerial problems in the sense that it shifts the burden of responsibility to the customer for assuring that the total system will interact properly and efficiently.

It also complicates the selection and procurement process because it expands considerably the number of vendors, products and alternative system combinations that should be considered.

There is also the coordinating effort that I do not mention in my testimony that sometimes seems to be a problem when you are trying to tie together different elements going to make up an overall system.

We have had a good deal of success in the procurement of equipment from the peripheral component subindustry to replace equipment in existing systems.

As a result of a Government-wide review required by OMB Bulletin No. 70–9, procurements from this source are enabling us to reduce rental costs by more than $19 million over the contract period.

The problems associated with the procurement of new systems are considerably more complex, but we expect that a study now being completed by GSA will be helpful in determining a future course of action.

Another issue is the slow pace at which the national effort to bring about a higher degree of standardization among computer systems is progressing.

We have continued to rely heavily upon this effort to move us in the direction of greater flexibility in interchanging equipment, software and personnel within the Federal Government, but the movement thus far has been disappointing and not very significant.

Perhaps this is because intercommunication among systems in the non-Government community can often be achieved by use of the same product or product line.

The Government's highly competitive procurement practice must provide for compatibility of data and programs that range over many product lines. So, to us, the need for progress in compatibility through appropriate standards becomes more significant.

Dr. Brascomb will undoubtedly discuss this problem during his testimony.

A third issue is the increasingly greater impact that software is having upon computer management. I should perhaps mention that the term "software" generally includes two types:

1. System-oriented software which causes the hardware components to interact in response to commands and which is usually produced by the supplier of the hardware system.

2. Application-oriented software which causes a data processing function to be performed, for example, payroll, inventory control, engineering computations, tax analysis, and which is usually produced by the system analysis and programing staff but is also available commercially.

Software—which constitutes one of the subindustries and, in a large sense, is the key to effective computer operations—has become increasingly complex and costly.

The opportunity we now have of acquiring software from a wide range of suppliers, while salutory in one respect, places a difficult burden on the customer in evaluating the relative merits of a vast array of products.

Continuing efforts to standardize certain general purpose programing languages emphasize the need for techniques to validate the language, that is, assure that a supplier's implementation is in accord with the standard.

These techniques have now been developed to the point where the concepts have been proven and the results may soon be available for Government-wide use.

We also need techniques for evaluating a supplier's implementation of the standard language to see how efficiently it functions in specific applications. This is a more complex development problem which I believe the representative from NBS will speak to in connection with the general subject of performance measurement.

Mr. Chairman, I have very briefly described the scope of our management program and some of the major issues that are of concern to us. Representatives from the GSA and the NBS are prepared to discuss the aspects of the program that relate to their specific areas of responsibility, and Mr. Cunningham, Mr. Renninger, and I will be pleased to elaborate on any part of this statement or endeavor to answer any questions that you may have.

I know we have one already pending.

Mr. BROOKS. Yes. We certainly appreciate the statement you have just made. It is a good one and interesting and a statement that points up the really challenging aspects of this computer business right now.

There are plenty of challenges left. You can readily see that it is not all done.

Mr. INK. That is right, Mr. Chairman. It is a dynamic industry, one that is rapidly growing, and one in which in many areas we have really only begun to even plumb the potential.

Mr. BROOKS. I sometimes think they have half the computers solving problems and the other half creating problems. Mr. Ink, is there any centralized coordinated organizational structure within the Federal Government setting national policy regarding computers?

Mr. INK. For Government purposes we do have, of course, the overall policy being established by the Office of Management and Budget pursuant to the law. We look to the agencies for carrying out the management program within OMB policies. On a national basis, decisions affecting computer technology are made within the context of the issue; that is, Patent Office for patent issues, Justice for antitrust, et cetera. The National Bureau of Standards stands ready to assist these agencies as does the Computer Science and Engineering Board of the National Academy of Sciences.

There is, I think, a great deal of emphasis that is needed in computer management along with some other areas of management, particularly these areas dealing with social programs where I feel that, in my judgment, we have not progressed as rapidly in some areas as we have in the highly technical and hardware-oriented agencies such as NASA, AEC, and the Defense Department.

Mr. BROOKS. The Policy Board certainly would help, probably, to resolve some of those matters and get some of those programs started. They might change the emphasis a bit and stir people's imagination and challenge them to solve some of these problems.

Mr. INK. Some of the technical problems I suspect Mr. Branscomb can speak to.

I think you might be interested, Mr. Brooks, that there is some thinking represented in the reorganization proposals that have come forward with respect to a greater emphasis on information systems, including the automatic data processing equipment in support of those information systems.

As the committee considers this area we would very much like the opportunity to work with you and other members of the committee in seeing what the thinking of the Congress is. I think this is another opportunity which we might have to join with the Congress in providing the emphasis that I think is needed in a number of these departments.

Mr. BROOKS. We will take a look at it.

Under Public Law 89-306 we coordinated computer management and use on a Government-wide basis, but as I see it, the emerging problem of a workable, effective policymaking structure within the Government on the use of this equipment still leaves us with a big blind spot.

The subcommittee has increasing difficulty in tracking down which officials in the Government have primary responsibility for policy in such vital fields as the East-West trade in computers, the patenting of computer software, the impact of computers on individual rights and privacy, long-range plans for the exploitation of computers in education and, in a broader sense, to help some of the Nation's growing social problems.

The Computer Board of the National Science Academy in particular, and individual Government officials in various agencies and at various levels, have been trying to cope with this difficult policymaking problem regarding these and a host of other matters relating to computers.

I just wanted to say at the beginning of this hearing that it is a matter of fundamental concern. It is a problem we are going to have to do something about if we are to maintain our technological advantage in the computer field.

I just do not think we can duck this issue by passing it from agency to agency. Somebody has to get a handle on this.

Your department, controlling the money, is probably the best one. You are not in the real hatchet division.

Mr. INK. I am glad you said that.

Mr. BROOKS. I understand that. The hatchet divisions use you and they can get attention better than those departments in the Government.

The OMB can influence and persuade departments to cooperate that had no intention of doing so. They have a peculiar characteristic of being able to get people to do things.

This OMB has a lot of power and could encourage them. This is encouraging them to do that which they ought to be doing anyway.

Mr. INK. I think, Mr. Chairman, one of the reasons there is cooperation from the agencies is the recognition that as the law and the intent behind it are stated, and the way in which the law has been implemented, it did not work against those agency needs which were very highly specialized and which needed to be varied in order to meet program requirements.

I think there was some concern at that time that those programmatic needs would not be recognized. That has not been the case and I think this also had an impact on the receptiveness of the agencies.

Mr. BROOKS. In terms of policy directives to the GSA, the National Bureau of Standards and the national agencies as a whole, what new emphasis have you placed and what do you intend to place on various facets of computer procurement and management and hardware?

Mr. INK. There is emphasis on components and software. As we indicated, while there are problems associated with it, the results seem promising.

We are very much interested in the test procurement which Mr. Kunzig mentioned which is underway in the GSA to assemble a package from a number of different vendors within the industries.

Mr. BROOKS. Mr. Ink, would you pardon me? I would think your hopes on that are not going to materialize. I do not believe the peripheral suppliers have evidenced much interest in that bid offering. I think if that continues to be the case surely they can find some suppliers in those areas that would be interested. You can offer to decorate the mahogany a little bit for them and I think you can create some interest.

It created a problem in the initial offering which was not received too well.

Mr. INK. No; my comment of hope really had more to do with the peripheral components. With respect to the assembly of the system package from different vendors, it seems to me that we really have to wait and see what comes out of that study. I am not trying to prejudge that at all. I do not know what will come out of it.

Mr. **Cunningham**. The test does give us some things to work on. It may support the statement you made. If that is the case, we may have to take other actions because now we have fairly concrete evidence that peripheral prices are considerably lower when you can acquire products from a wider range of suppliers. Meanwhile there are other procurements going on in which certain aspects of selected separation are involved.

Mr. **Brooks**. If this one does not give you the results that you feel are obviously available we can change that technique. It is not an insoluble problem. With a little more massaging, they will come around. Just don't turn them loose.

Mr. **Cunningham**. As Mr. Ink testified, there are changes coming about in the pricing structure.

Mr. **Ink**. It seems to me that it is desirable to have an environment in which these kinds of options are available.

Mr. **Brooks**. I have, Mr. Ink, some additional questions that are fairly technical and I wondered if it might be the subcommittee's desire that you might answer those for the record so we can hear Dr. Branscomb and the other witnesses now.

Mr. **Ink**. We would be happy to do so.

(The questions and answers referred to above follow:)

1. With 5 years of experience behind you, do you believe that the coordinated approach reflected in Public Law 89–306 has worked effectively?

Yes, I believe it has. The approach prescribed by Public Law 89–306 capitalized on the expertise of the individual agencies and recognized the principle that computers are a means to an end by specifying the responsibilities of the using agencies for determining how computers can best assist them in carrying out their programs. Equally important, the law provided the means for developing Government-wide programs which enable us to acquire and use the necessary computer resources more efficiently and economically. The following examples I think illustrate some of the accomplishments:

The increase in ownership within the Federal inventory from 39 percent in 1964 to 64 percent in 1970;

The increase in cross-utilization of facilities, also known as sharing;

Centrally negotiated multiple procurements;

The consolidated tape testing and procurement practices involving both NBS and GSA;

The development and adoption of standards for the technology and for data to assure greater compatibility;

The OMB Bulletin No. 70–9 dealing with the Government-wide procurement of peripheral components which involves a reduction of $19 million over prior prices. This case illustrates the interaction of GSA and the using agencies in the sense that GSA identified the opportunities for replacements within agencies who, in turn, made their selections and GSA then negotiated a Government-wide procurement under the "single purchaser" contract.

2. How many people do you have on your staff in OMB overseeing Government management of computers?

We have six professionals and two secretaries.

3. And, you feel that this is adequate for the task?

Consistent with the overall philosophy of a small Office of Management and Budget staff and recognizing that the operating and technological problems rest with GSA, NBS, and the agencies, I believe it is adequate.

4. Before going into a discussion of present OMB management and use policies, it would be of interest to the subcommittee to have a brief discussion of some of the more significant developments or changes in the data processing area in the last few years—say, since our 1967 hearings. As an example, what about the structure of the computer industry itself?

Not too long ago, I read that John Diebold, who has a considerable reputation as an expert in the field of automation, projected that the "computer" or "information" industry would in the 1980s become the largest industry in the United States. From a relatively small beginning in the 1950–53 time period, it has grown to a point where the gross sales last year were in the neighborhood of $5 billion. Because of the wide area of interests that are involved and the industry's interaction with the electronic industry, the communications industry, et cetera, the best we can do is look at the order of magnitude figures.

As the industry has grown more rapidly in the past 5 or 6 years, we have seen the emergency of subindustries. For example:

(*a*) Firms engaged in various aspects of the electronic business have noted the large market potential of specializing in particular classes or components of computer systems. By specializing in these units, they have been able to offer prices that are very attractive by comparison with the "system supplier prices."

(*b*) The introduction of computer terminals is also making a considerable change in the industry since the terminal, combined with selected kinds of sophisticated software, has, in fact, brought the power of the large computer to the laboratory, bench, or desk and therefore has much potential for the future. This technique is now being used in some large applications to eliminate the necessity for creating punched cards as an original entry document.

(*c*) The unbundling of system prices has emphasized the use of independent software and many firms now specialize in software products.

(*d*) Third party maintenance, much discussed in the past, has in the last year or two become a reality and is bringing with it the notion that we can acquire internal components of the computer, such as the memory, from a third party more economically.

The impacts of these developments, of course, are many—

(*a*) The problem posed for the manager of a computer installation when more than one contractor is responsible for the maintenance and efficient functioning of the computer system.

(*b*) The difficulties involved in procuring and assembling equipment components from many companies into an operational entity which must operate with software provided by some of the same companies and possibly some others.

(*c*) Further emphasis on the compatibility problem because of the absence of industry standards which would facilitate the interchangeability of components.

5. The last year or so, the computer industry has talked endlessly about unbundling. Would you give the Subcommittee an explanation of what the term means, and the impact of unbundling on Government management and use of computers?

Mr. Chairman, the term originated when the IBM Corporation announced that it would separately price many of the software components and services which were provided with the computer system. Prior to that time, the suppliers provided these components and services as an integral part of the total product at a single price. Whether this ever-increasing burden became too much for the suppliers to bear, as may have been illustrated by an article in Fortune around 1967 when the President of IBM stated that they did not know what the 360 software was costing, or whether other factors contributed to the idea of unbundling, I don't know.

When software was provided by the computer supplier, he in fact controlled the capability of the total system to perform against requirements. Now, we have the option of commissioning the development of or procuring software from other sources which is more specifically responsive to a given user's needs. But as I indicated in my prepared statement, these options add to the complexity of our managerial and procurement problems.

6. Is it my understanding that software and services, at least on the part of some computer manufacturers, were considered gratuities up until unbundling?

Yes, but only in the sense that they were included, without separate identity, in the price for hardware.

7. Has unbundling been good or bad for the Government?

Certainly it is causing us some problems, as I indicated earlier. I think when we learn how to cope with these problems, the ultimate result will be beneficial.

8. Have there been any changes in other marketing practices emanating from the industry?

Yes, there are constant changes in marketing practices. For example, we are now seeing the development of a used computer industry which opens up new sources of supply. And, there is a constant shift in pricing strategies in response to requests for proposals which is due to the competitive nature of the industry, the growth of subindustries which I mentioned, and the general maturing of the industry.

9. What has been the Government's response to these changes that you have referred to?

Mr. Chairman, a number of actions have been taken. For example, with the emergence of the peripheral subindustry we took action to replace all of our rented components in which it was economically feasible to do so. Also, GSA has engaged in a test procurement to determine the processes and advantages of procuring and assembling systems initially under conditions where the various subindustries are a part of the competition. With the availability of software products from many different sources, we are concerned with the development of techniques for validating and measuring the performance of those products, and this is a matter which NBS is giving priority attention.

10. In terms of policy directives to the GSA, National Bureau of Standards, and the agencies as a whole, what new emphasis have you placed and what do you intend to place on various facets of computer procurement and management, beginning with, say, hardware?

I have already referred to the emphasis that has been placed on the procurement of peripheral components and the test procurement under way within GSA to assemble a system package from a number of different vendors within the subindustries. We are emphasizing the use of the ADP/MIS to evaluate further opportunities for cost reductions through the use of the ADP Fund as well as direct actions by the agencies when this is possible. The National Bureau of Standards will be placing additional emphasis on the use of hardware monitors and other performance evaluation techniques to improve our utilization of hardware systems.

11. What about software management and use?

I think our most important need in this area is the development by the National Bureau of Standards of techniques for validating whether software products do, in fact, conform with specifications when these are available. Related to this is the need for performance evaluation techniques by which we can determine the efficiency of software products. As these techniques become available, it will then be possible for the procurement process to concentrate more heavily on the procurement of common software packages for use throughout the Government.

12. With the fragmentation that you speak of, how can we maintain reasonable policy and managerial control over so broad an activity?

I think the key here is to be sure that we maintain a flexible position in our policies and practices so that we are able to respond as quickly as possible to the kinds of changes we have been talking about. This means also that we must be alert to the changes that are occurring within the industry, and it is for this reason that I have emphasized rather strongly the need for us to maintain close relationship with representatives of the industry, so that both of us can get a better appreciation of the problems and opportunities that we face. As time goes on, it is probable that we will be facing the need for some changes in our management structure which will make it possible for us to respond more effectively to the changing needs. I have in mind the possibility that it may be beneficial for us to begin thinking in terms of a greater centralization of certain key operations in the computer management process, such as in the use of simulation techniques to improve computer performance and as an aid in the selection process, or in the evaluation of certain hardware and software products.

13. Would it be possible, through the centralization of these key operations, to provide a more effective means of coping with such problems as hardware and software evaluation and equipment selection?

Yes, I think so. For example, the use of simulation techniques and other performance measurement techniques are so complex that I think the Government would benefit tremendously from a concentration of technical expertise in these areas. With this kind of an arrangement, it should be possible for us to move more quickly and skillfully in the development and use of performance measurement techniques and in the development and use of techniques for the validation and evaluation of the systems and products that we procure and use throughout the Government.

14. What is your present policy regarding the revolving fund, appropriations to it, and the ultimate capitalization of the fund through the transfer of all general purpose equipment into it?

To date, the appropriations to the ADP Fund have been only $30 million, $20 million of which was made available this past winter. In general these funds have been used to take advantage of unique situations whereby the use of the fund could save us some money. Our thought is that the fund will gradually expand through additional appropriations and as more of the general purpose equipment used by the agencies is transferred into it.

We believe, however, that before such expansion could really produce meaningful results, it is necessary to achieve a greater degree of compatibility among the computer systems than we now have in order to facilitate the inventory management process. Certainly my hope is that we will see a significant expansion of the fund within the next 3 to 5 years.

15. What about multiyear leasing?

I believe that multiyear leasing can be an attractive method of procurement provided some of the legal complications can be clarified and overcome. But I think we should not overlook the fact that it is only one of the many options that are usually available, and that specific circumstances will usually dictate which of these options should be used.

It is also true that the outright purchase of equipment usually provides the greatest financial advantage and I would not wish to see multiyear leasing be used as a substitute for purchase.

16. What level of capability do we have in the data processing inventory system that was developed pursuant to our recommendations as outlined in Public Law 98–306?

We expanded the inventory system shortly after Public Law 89–306 was enacted and within the last year have made some major revisions which we think will further improve our management capability. Even so, we are not at all satisfied that the system is as good as it can be, and this will continue to receive some emphasis.

17. Have you issued any directive concerning the development of a software inventory?

The present inventory system does not include a software inventory, although we have made some tests on the kinds of data that could be readily obtained and its usefulness in the management process. Our thought at the moment is that based on these tests we can develop some gross indicators of the software currently in use which will be useful, not for the purpose of facilitating the exchange of the software, but rather for the purpose of helping in the development of central procurement programs. The National Bureau of Standards has also been doing some useful work in the development of guidelines or standards for identifying and describing software so as to facilitate a meaningful exchange of software and to minimize redevelopment efforts wherever possible. As this work progresses, we will be in a much better position to formalize and use a software inventory as a part of our management process.

18. Earlier in these hearings, Congressman Culver raised a question concerning the computer's potential for solving some of the Nation's social problems. Will you comment on this question.

Before answering the Congressman's specific questions, I would like to make an observation with respect to the use being made of computers generally and the impressions that one gathers of the manner in which they are being used. Most survey reports and special studies of national or local use of the computer done by reliable firms or individuals leave the impression that computers are being used for routine functions such as payroll, accounting, inventory control, et cetera. There are fundamental reasons for this conclusion and impression:

1. These traditional systems involve well-known and well-understood processes.
2. They generally represent large work volumes and therefore take much time, involve high cost and have a degree of interest and commonality.
3. Measures of use of computers employed in these studies generally center around the high cost of the operation.
4. The use of computers in societal, environmental, and economic applications may, on occasion, involve large-volume work but more frequently involves complex, intricate planning but relatively limited processing time. Therefore, such studies frequently classify the more sophisticated work in the "all other" category because cost, not significance, is the measure of use.

The greater visibility that is usually accorded the more popular types of business-oriented computer uses tends to overshadow important computer uses in other fields, such as the societal areas in which interest has been expressed here today.

THE USE OF COMPUTERS IN SOCIETAL AREAS

The patterns of use for computers in societal areas can be looked at in many ways. One set of categories includes use in:

I. The operations of an organization in the societal area and its programs.

II. The collection, compilation, and distribution of information or statistics about a program or a problem area.

III. The research projects or programs addressing societal problems.

These same categories can be applied equally well to nonsocietal areas. In fact, computer applications development within each of these three categories is quite similar in societal and nonsocial areas.

Under category I, operations, the agencies with extensive responsibilities in societal areas have developed many computer applications in the general administrative area to improve their effectiveness and lower their costs. Development began with early computer installations and has continued to the present to improve personnel/payroll, accounting and financial management systems.

In the operation of programs associated with particular missions in societal areas there is also extensive use made of computers. The natures of these uses and the histories of their development cover a broad segment of the total national computer use spectrum. At one end of the range are the large-scale, now almost taken for granted, uses of computers to maintain all the records and pay the benefits for the old age and survivors insurance programs and Medicare by the Social Security Administration, veterans insurance programs and State unemployment compensation systems.

Further along the spectrum are a number of applications, some old and some new, which are intended to improve the ability to manage programs or processes. Within this group are the grants management information system at the National Institutes of Health and the work with the courts on the case scheduling systems. These applications don't have as an objective a change in the basic operations: but bringing the operations under improved management control contributes greatly toward the effectiveness of the total program.

Toward the other end of the spectrum are operations applications such as the hospital patient monitoring and realtime police dispatching. Flood and earthquake warning systems are also being improved by applying computer technology to devise approaches that were not feasible previously.

Category II, the collection, compilation and distribution of information or statistics about a program or a problem area is separated out for consideration here. Although it overlaps with the other categories, its importance stems from its relevance to the understanding of social problems.

The use of electronic computers for data processing in the Federal Government began with the Bureau of the Census. Among other longstanding users are the Bureau of Labor Statistics and the National Office for Vital Statistics (now part of the National Center for Health Statistics). Today computers are used routinely in all the national statistics programs.

Extensive work has also been going on in developing computer-based systems for compiling and distributing diverse types of information of importance to society. These range from large, comprehensive systems like the National Library of Medicine and the National Crime Information Center to projects which provide a single major document such as the Federal outlay report—a multivolume statement of the funds spent in each city, county, and State by all Federal Government activities.

These information/statistical programs do not in themselves provide solutions to problems. But their value is enormous where they succeed in making available the needed, timely and accurate information to those who are attempting to solve problems and who then provide the basis for new policies and new legislation.

As the computer technology advances, new and better methods are being applied to improve these information sources and systems. Improved technology properly applied increases the opportunities for providing the needed information to the proper people at the proper time.

Many of these information systems provide immediate operational benefits. For example, data from the National Crime Information Center provide current information to the policeman at the crucial moment when he needs it.

Under category III, research, one objective is to provide computer capability to the research scientist for use in carrying forward his projects. NIH, for instance, has a large computer center which is available to its scientists. In addition, smaller computers are used in some of the laboratories to aid in direct experimentation. Both Government and federally funded university research scientists are using computers with increasing frequency in their studies. Their current research covers a vast range from wage rates and inflation in economics to victim-offender studies in sociology and voter patterns in political science.

An area which is particularly promising and heavily computer dependent is the use of models and simulations in studying complex and dynamic segments of society and its environment. For example, the computer provides the ability to structure models used in improving understanding in economics, transportation and urban planning, and the capability to use these models interactively in increasing the understanding.

Another aspect of the research category is the use of computer technology not only in studying a problem area (as cited above) but also as a part of the solution. For example, a research program for developing an improved transportation system may include computer-controlled traffic as one of its elements.

The results of these kinds of research uses of computer technology may be to initiate changes in operations such as those discussed under category I.

There are some observations which can be made about the status of computer applications in societal areas.

First, there is a lot going on. Much of it perhaps is not dramatic and the results are not conclusive. From one standpoint it seems that all that we see is a bit of a solution here and a piece of a problem there; when what we want are large, comprehensive systems designed to address major chunks of our problems.

Second, more can be done and should be done to ensure full, effective application of computer technology to appropriate societal areas.

The real challenge comes in determining where and how the "more" should be applied and in defining the problems to be solved with the degree of preciseness required for computer applications. We have learned, for example, that some computer-based operations systems must evolve over time. The separate computerized bits and pieces are ultimately combined until a comprehensive, unified system design emerges. Only in this way does our increasing understanding at each stage reveal the true complexities to be resolved before the next stage is reached. This evolution is well illustrated by the use of computers in both the automotive and aircraft industry design and production process. While evolving, efforts have been required under all three of the categories developed above: operations, information systems, and research. To try too grand a design too soon can result in nothing.

The same kind of evolutionary requirement is found in the research fields. Before the economists could attempt today's models of the total economy they had first accumulated and studied data separately on the parts such as private investment, consumer spending, Government expenditures, and interest rates.

Determining the right directions for future effort will require constant, close coordination at many levels between those in the computer and information sciences communities and those who focus on societal areas.

In summary, the success of our application of computer technology depends upon a partnership. New approaches in concept and execution will hopefully result from this partnership.

Mr. Brooks. Mr. Buchanan.

Mr. Buchanan. I was very pleased to hear your response to the chairman's earlier questions. I am quite certain that OMB would not approve or go along with the departments or agencies using supergrades for filing clerks or Ph. D.'s for stenographic services.

By the same token, although that is an exaggerated analogy, I am sure you would not approve the underemployment of these very sophisticated resources and I hope you will assume clear and aggressive responsibility to make certain these resources are fully employed and give whatever encouragement you can to see that they are used to attack the tremendous responsibilities of HEW and other like departments.

Mr. Ink. I think it is obvious that we are in a much later stage of development with respect to attacking many of the social problems. It has its own set of complexities. One of the things that I would strongly urge is that people not try to adopt the highly sophisticated techniques that have been developed in the space and atomic energy areas in these social areas without careful adaptation and redesign. They generally will not work. They are created for different purposes and a different environment.

Many of the principles can be drawn upon and many of the individual techniques can be drawn together and reworked into something that is very useful. This RAMUS system that Mr. Dodson of GSA mentioned earlier in HUD was something that I started when I was in HUD because my first effort was really to design something more sophisticated than that environment was in a position to utilize. We reworked it into something that was fairly simple and straightforward as a first step upon which a more sophisticated system can be built.

Mr. Brooks. Would you include in the other questions we are going to submit to you for answering some detail on social reform aspects and potential, which you can do for the record?

Mr. Ink. Yes, sir.

Mr. Goldwater. Mr. Chairman, do we have time for one quick question?

Mr. Brooks. Certainly.

Mr. Goldwater. Mr. Ink, in your concern for standardization, which I think is justified, I am somewhat concerned about your utilization of private industry in trying to solve this problem.

This question is prompted by your statement in regard to software where you say you utilize programing staff, but this is also available commercially. Where does the staff leave off and where does the commercial effort come into play, and what is your policy in regard to the use of private industry in trying to solve this problem of standardization?

Mr. Ink. The working groups——

Mr. Brooks. Mr. Ink, if you would give a concise answer to that it would be helpful because I am sure Dr. Branscomb, who is head of the Bureau of Standards, can give us a more complete answer.

Mr. Ink. He can speak to this better.

Let me just say that the working groups dealing with standardization involve both people from the Federal agencies and the industry.

I think Dr. Branscomb can lay that out for you.

Mr. Goldwater. In other words, you try, wherever possible, to use the industry?

Mr. Ink. Yes.

Mr. Brooks. Thank you for appearing.

Our next witness represents the National Bureau of Standards. With us today is Dr. Lewis M. Branscomb, the Director of the National Bureau of Standards, and Dr. Ruth Davis, the head of the computer center. Under the women's lib operation we have her at the head table. We are delighted and honored to have her representing not only women but the National Bureau of Standards. It is a pleasure to have you with us and we look forward to having the benefit of your views and comments concerning the vitally important question of computer standardization, as well as certain related areas of interest to the subcommittee.

Doctor, you have a prepared statement. I wonder if it might not be more helpful to submit that for the record and go into the questions we have and first perhaps handle the question as to why private industry is helping on computer standardization, just concisely why we need the manufacturers in on that study, and so forth.

STATEMENT OF DR. LEWIS M. BRANSCOMB, DIRECTOR, NATIONAL BUREAU OF STANDARDS; ACCOMPANIED BY DR. RUTH DAVIS, DIRECTOR, CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY

Dr. Branscomb. All participate in the voluntary standard-making process in our country. Several hundred people from the Government do so. They there join many hundreds more from private industry. The Bureau of Standards is dedicated to the principle of consensus derived standards and to initiative from the private sector in the development of these concensus-derived standards. That does not mean, however, that the Government is not entitled to its own "company standards," to use a phrase analogous to that used in the private sector, standards arrived at expeditiously and responsive to its internal needs. But even in this case we would want to derive as much benefit as time and willingness of the private sector permits, to incorporate technical inputs from the private sector into the Federal standards process. I would personally hope that by working together with the private sector we will find that Federal standards and the private sector standards as they evolve will be fully compatible one with the other.

Only in this event will the Government's purchasing power really work in concert with that of the private sector to insure a strong and responsive industry in the future.

Mr. Brooks. Doctor, what are the statutory authorities under which the Center for Computer Sciences and Technology operates?

Dr. Branscomb. Public Law 89-306, the Brooks bill, section 306(f), authorizes the Secretary to make recommendations regarding the establishment of uniform Federal ADP standards. The Secretary of Commerce has delegated this authority to the Director of the National Bureau of Standards in Commerce Order 32-A of October 1, 1968. When my predecessor established the Center for Computer Science and Technology within the Bureau of Standards this authority was again delegated to the Director of the Center. Dr. Ruth Davis on my left now occupies that position. We received policy guidance for pursuing these Commerce Department responsibilities under the Brooks bill from the OMB embodied in a policy guidance letter to the Secretary dated December 15, 1966.

I would just like to add that in addition to those authorities the Bureau of Standards and its component Center for Computer Sciences and Technology function under the authority of our Organic Act of March 3, 1901, which established the National Bureau of Standards and provided for our assistance to other Government agencies and to the private sector in standardization, measurement sciences and other fields, much of which is germane to the computer problem.

Mr. Brooks. Certainly we appreciate this assignment to Dr. Davis. It is a nice challenging job they gave you.

Dr. Davis. Yes, sir.

Mr. Brooks. If it had been easy they would not have given it to you. What are the most significant changes in the methods of computer utilization since 1966?

Dr. Branscomb. I think one of the biggest changes is the evolution of higher level programing languages. These languages permit the computer to receive inputs from people who are more nearly laymen, who have less sophisticated mathematical training and who write programs more nearly in ordinary English than in mathematically oriented languages. This has had the impact of making computer operating systems more complicated. Unless those computer systems are used in an even more sophisticated way it threatens to drive up overhead programing and costs.

I think the second major change is the emergence of time sharing or computer networking or teleprocessing. These are more or less synonymous terms for a process which permits many different groups or individuals to assess the same central computer capability. It provides a great opportunity for more effective means of utilization when the need is distributed throughout different parts of the country. Examples are the selling of airplane tickets, among others.

The third change that I would identify is evidenced by the fact that while on the one hand we have been moving toward bigger, more powerful central processors that can be assessed by time sharing from different locations, concomitantly, at the other end of the spectrum industry has provided us with the minicomputer. These are small computers that cost less than $50,000. Their sales are rising very rapidly.

The estimate is that while there were only 600 delivered in 1969 there might be as many as 30,000 in 1974. Many of these small computers will in fact perform at a level which is superior to that of the first-generation big computers that started the whole computer era just a couple of decades ago.

Mr. Brooks. Doctor, isn't it possible that we define in more definitive terms the word "standardization" as it applies to various facets of computer operations, and identify in better terms the benefits and sometimes disadvantages stemming from standardization?

Dr. Branscomb. Your question is very perceptive. It calls for recognition that if a standard is only a piece of paper it is not worth very much. One really must have a standards system in which the standard serves to document agreement between affected parties, both sellers and users in most cases, the language of the marketplace. In addition, a standard helps define the rules by which people agree to use equipment in order to get more efficiency. These are also standardizing bodies which, where possible, determine a means for measurement of performance. Otherwise, a standard by itself is of little good unless it is put to use.

That means there must be a system for insuring within the Government and elsewhere that the standard serves a significant purpose and that there are adequate instrumentalities to further its adoption in practice.

If I may, I would like Dr. Davis to expand on that comment.

Mr. Brooks. Go ahead, Doctor. This is a very key point in this matter. Standardization is a general term and it requires so much cooperation from industry and from purchasers and from the National

Bureau that they ought to really determine what they are trying to agree on.

Dr. Davis. Your question reflects the fact that standards and standardization are simply one portion of the process of correct management of computer services. As a process the development of a standard per se is simply a technological tour de force. You must have coupled with that development the means of measuring compliance with the standard, the means of determining and supplying to Government agencies what the benefits of the standard are as well as the costs associated with not using the standards. One must recognize that the process of standardization is in itself an expensive process.

Examples of costs of nonstandardization occur every day. Let me take some simple examples. Every time two computer facilities wish to interchange data tapes when they are not using standard data codes there is an associated cost of several weeks to several months of reprograming to convert one file to another. This is simply the conversion of one data character set to another. You can measure the costs on a daily basis to the customer in terms of programing costs and the loss of time before he can manipulate the data.

Another example that I think is very important——

Mr. Brooks. Pardon me, Doctor, that particular example hit home. It is nice to have the names of all the people in the district. You might want to communicate with them. Different counties had different systems. The program was written for one system and to combine it with the other was a very difficult matter. It sounded very simple but it was not. We got it done just in time to use the names during the election. It can get most complicated.

This was really a kind of ABC example, but it must be tremendously expensive and complex in terms of cost and usefulness of the ultimate information.

Dr. Davis. Let me just give an example following along your line of reasoning. I will not term it standards for documentation, but there is a need for adequate documentation so that we programers leave a facility——

Mr. Brooks. Identification of what is on that program in terms that somebody else can understand?

Dr. Davis. Yes, sir.

Mr. Brooks. Other than the man who wrote it and designed it?

Dr. Davis. Yes, sir. As an old time computer buff, I know that one needs identification for yourself a year later as to what you meant at the time you wrote the program. The need for documentation of this kind may not indeed be a standard itself but must have minimum essential elements for identification of documentation.

Mr. Brooks. This is only if you ever want to use the data.

Dr. Davis. Right. This need is reflected in the myriad of duplications of simple application packages whether they are mundane payroll-like applications or very important applications to social needs such as diagnostic routines for surgeons and physicians.

The last very simple example that I think is worth bringing up was brought to my mind by the comments you made on a management information system in GSA. Certainly from a technical point of view, the only feasible way of keeping such a system updated on a reasonable basis whether weekly or monthly is to have data entry at the source. This means the ability to have people entering data from their own locations which goes directly into the computer base of GSA. This process requires standardization of data, entry forms, and the standardization of the communications process. Probably most important is the recognition that right now, today, about 17,000 man-years annually in the Government are spent on keyboarding data for input.

Any identification of typewriter keyboard standards, OCR standards and the like, is going to impact very heavily and very immediately on these costly and, quite frankly, very frustrating problems of computer service management.

Mr. **Goldwater.** Mr. Chairman, one question, if I may.

Mr. **Brooks.** Surely.

Mr. **Goldwater.** How is this problem compounded because of the procurement policy of using various sources within the industry? Should we use IBM and Univac and RCA and all of the different companies which are all a little different? How does this attempt to standardize it? Is the problem compounded between companies?

Dr. **Davis.** I think it is the familiar chicken and egg problem. I do not know which has compounded which. I believe the purpose of standardization, as we have been talking about it, is to allow a competitive marketplace and allow the procurement of equipment from the various manufacturers while still not putting a burdensome problem on the users who are interchanging data between the equipment of two different manufacturers or between different generation equipment of the same manufacturer.

Agreements on documentation or programing languages will allow the same application package, that is, for example, a package for the chairman so that he may have an inventory of names of constituents to be run on any one of several computers. This will not in any way stifle industry in its development of better computers or in its competitive mode of operation.

Mr. **Goldwater.** But each industry does have its own concepts. Your idea is to set the standard and let the industry measure up to it.

Dr. **Davis.** Yes. This refers back to Dr. Branscomb's answer to you on standardization practices.

Dr. **Branscomb.** Through standardization of conventions or the manner in which dates, counties, and names will be written and through standardization of interfaces, such as how many tracks shall be on a tape, which I think was one of the problems you faced in the example you gave, we derive design or specification standards. We must have a certain minimum of those if there is to be interchangeability and efficient utilization of computers. This is similar to the situation where we have only a finite number of sizes of nuts and bolts in the country.

If you had thousands of different shapes and sizes of nuts and bolts, then the manufacturers would be immersed in inventory and it would be terribly expensive. So we agree to produce and use nuts and bolts of certain preferred sizes and shapes.

Design standard simplification is the thrust of the effort. But I want to emphasize very strongly that one must not get carried away by this process. One must limit design standards to just the minimum of compatibilities that are necessary to make the system work.

For the other purpose of standards, which is to enable you to specify the performance you want at the minimum cost, you want a performance based standard that does not tell the industry how to solve the problem but tells them what problem you want solved. When it comes to buying software, for example, the Government spent $182 million last year, just for separate software packages. In this case, you would like to be able to insure that those software packages are compatible with different computers. Other than that I want to specify what performance I want out of software that I obtain from vendors. I want to put them to quantitative performance tests that do not restrict the vendor in the genius he uses to invent the software but give him an incentive to design more efficiency than his competitor.

Performance standards can enhance innovation as well as competence. Design standards are useful in maintaining competence.

Mr. BROOKS. You have just answered my next question very nicely.

How can one achieve a useful inventory of computer software?

Dr. BRANSCOMB. Dr. Davis I know has been working on that, and if I may I would like to refer that question to her.

Dr. DAVIS. A short answer would be that if we knew how, we certainly would have an inventory by now. It is definitely a detriment to people who are trying to procure software not to have one. Let me give you now some technical reasons why we do not now have an inventory of software or a qualified products list such as GSA maintains for equipment.

First of all, it has only been recently that software procurement became identifiable as a management problem equivalent to hardware procurement. The ability to procure software packages where one states the objective of the package by listing how you want it to operate in a way definable to industry so they could bid and to Government so they could assess the product has really occurred within the last 5 years.

I will say that we have collected the efforts of some 60 different organizations within and outside the Government which have attempted to compile software inventories that would allow you to select and to make a determination as to what the capabilities and what the specifications were of various software packages.

All of these are in very beginning stages of utilization. All of them are unsatisfactory to the extent of being a product that we at the Bureau of Standards feel is adequate for experimental use in the Government. We are attempting to use probably the best of these in the Government for evaluation. This is the inventory set up by NASA in their cosmic center in Georgia. Here they publish program abstracts and have some 800 validated programs on file now that you can buy as a service from that organization.

We are now trying to set up not just the performance measurements Dr. Branscomb mentioned for computers but performance measurements for software. Almost none of these inventories describing software packages state how long it takes to run a program. When you buy a software package for a particular computer you do not know, based on the available data, how long it will take and therefore how much it will cost you to use that particular package.

In summary, then, a software inventory is as essential, if not more so, than an improvement of hardware inventories. It is one of the areas on which we are placing major emphasis since it is a technically oriented problem.

Mr. **Brooks.** And increasingly costly, too.

Dr. **Davis.** It is increasingly costly.

Mr. **Brooks.** And will be more so.

Dr. **Davis.** We know that there are over 80 payroll packages. There are some 20 programs to help physicians in clinical diagnosis. We do not know how to compare them and we do not know which ones are the best for various applications. It is a manifestation of the fact that computer services are not limited to hardware.

Mr. **Brooks.** Do you have any indication of the major problems facing ADP customers in the Federal Government.

Dr. **Branscomb.** We do not have as good a systematic coverage of the priority problems as we would like to have, although we do have indications of the sort you asked about. I think in brief, that examples of some of these problems would include the one Dr. Davis was just speaking to, that is the problem of how the customer goes about selecting a computer system, and in particular how we can make a competitive bid system work. Such a system, it seems to me, can only work if one has quantitative measures of value in relation to anticipated cost.

That brings up the problem of how one measures performance.

The second set of problems concerns questions about how best to take advantage of the large inventory of second-generation equipment which the Government has as a consequence of its procurement policy and how to handle the question of compatibility between that current inventory and the future equipment we are buying.

The third question which seems to me to be a real problem to other agencies has to do with controlled accessibility to the information in computer data banks. At one time you could just lock the computer room door. This is getting more and more complicated as one makes extensive use of systems with teleprocessing or with time sharing. In these cases, it may turn out to be cheapest—and I feel sure it will—in some systems to have the data that is on file in the computer's memory located in different places around the country and thus accessed in different places. Here we will need more sophisticated systems.

I am sure Dr. Davis would like to mention other problems.

Dr. **Davis.** I would simply elaborate a little bit on what Dr. Branscomb has said. The computer selection process in this day and age takes 18 months to 6 years. It obviously needs help. The steps in the computer selection process that are technically oriented are able to be bounded and addressed. One of these involves means for comparing the relative merits of computer systems being bid. This is more complex than just comparing the computer hardware. It includes comparing the services that they are to provide.

This problem has been tackled in the Government up until now through such techniques as benchmarking, simulation, looking at evaluation handbooks, attempting mathematical modeling and perhaps actually running test problems.

In the area of controlled accessibility to data banks, I think it very useful to be able to enumerate—and one can enumerate from a technical point of view—ways of insuring protection to the individual where data is indeed identified on an individual basis. One can assess also the correlative costs. There are very few technical problems now facing the Government which do not have associated with their solution problems of cost. There are many ways of resolving problems, each of which has its own associated costs.

Every technical solution should have correlated with it its cost of resolution so that the customer or the Congress or the OMB has a choice mechanism for making decisions on procurement practices, for making decisions on policies such as multiyear lease or procurement on the basis of the lowest cost peripheral equipment.

I think decisions about peripheral equipment and accessories at this time have suffered from lack of technical input.

Mr. **Brooks.** Doctor, you may want to look over your comments on this and expand on them a little. This is a fascinating subject and your answers are most pertinent and helpful. We will make this record available to you and you may want to add some additional examples. I think those are all excellent.

I have a couple of other questions and then I want to get to our next witness.

Doctor, what is your assessment of the Nation's posture in computer applications?

Dr. **Branscomb.** Computer applications are obviously expanding at a great rate. I think indeed that the opportunity for the country in this area is perfectly enormous. This is evident if you look at the computer applications from an economic point of view and realize that in this country an increasing fraction of our national economy is based on service industries while a decreasing fraction of the total, but an increasing absolute amount, is based on manufacturing of goods.

We have a desperate need to increase the productivity in our service industries if we are to keep American wages and the standard of living up where we want them. The computer is science's gift to the service industries in my view. It provides opportunities to increase their productivity and to make more efficient use of all the resources we have that we used to think were so vast and we now realize are limited. I think the extent to which the business community is satisfied with the computer as an important and useful tool is quite substantial.

The indication we have from surveys indicates that business is able to take advantage of computers in ways that they find satisfying. I think we have just really seen the beginning of the effective use of computers in our society.

Mr. **Brooks.** Did you want to add to that, Dr. Davis?

Dr. **Davis.** I would like to say that this answer is relative to Mr. Culver's earlier question. At this particular time there are already some 1,200 identifiable applications of computers. Unfortunately, the majority of these that are well known are of an accounting or management nature. We are faced now with the problem of getting people to associate computers with the good they can do toward resolving the social problems of the Nation. It escapes most people's attention, for example, that a large number of computers are now being utilized in hospitals for handling diagnostic procedures and for assisting physicians.

There are over 500 computer systems in hospitals at this moment in direct support of individual medical needs and individual hospital needs. In education, computers are not being used just for management but are being used in very primitive but yet very successful initial attempts to have self-paced education become a reality. This means that one can proceed in education as fast as the individual is able. There is no question about the fact that this use of computers is expensive at the moment. But the realization that people now accept computers as teaching aids and that one can get through a course at his own rate and not have to go along with the class median.

Mr. BROOKS. Is that the Hampshire School?

Dr. DAVIS. There are several systems. Pittsburgh, Pa., and Michigan have experiments viable enought to have usable results at the moment. I think also, that in continuing education—for all of us oldsters—it is even more important for us to keep up with rapidly changing society and conditions. Computer-assisted education allows us to sit down and determine on our own, in our own homes or offices, that we will have self-educational programs and select those we need.

Mr. BROOKS. For upgrading and maintaining technical information in your field or for doctors or lawyers or technicians of any type?

Dr. DAVIS. Yes. This is a terribly exciting application. Also the role of computers in applications for law enforcement is a role that I don't think has excited people to the extent it should. The ability that now exists for policemen in patrol cars to have small television tubes or little printers and actually sit in the car and call in to a remotely located computer bank and get information on the license number of the car in front of them is an application that is going to aid the benevolent aspects of law enforcement in this country as nothing else can. It is a rehumanizing role for computers as opposed to the much jaded expression of the dehumanizing role of computers.

Mr. BROOKS. Mr. Buchanan?

Mr. BUCHANAN. Representing, as I do, a very fine medical center in the city of Birmingham, I am aware of the exciting use of computers in medical research and otherwise in medicine.

Speaking of Birmingham, Mr. Chairman, during the last year or so, as you know, our subcommittee has dealt in the problems of air traffic control. One problem that has been a particular subject of our hearings has been the near saturation of certain terminal areas such as New York, Chicago, and Atlanta. Meanwhile, at the Birmingham Airport, for example, we have a very fine, modern facility which is underemployed, not used anywhere near to its optimum extent.

I wonder, Dr. Branscomb, whether modern computer techniques, utilizing such mathematical concepts as linear programing, could be applied to the Nation's air traffic control system to route a significant portion of the through-traffic that goes into Atlanta, for example, to other airports in the vicinity such as Birmingham?

Dr. BRANSCOMB. Mr. Buchanan, I firmly believe that such mathematical techniques coupled with the assistance of computers can make it possible for the airlines, the FAA and the other authorities involved to make rational, objective, independent evaluations of exactly what is involved in the optimum of our airports, our airlines, and giving the best service to the people.

Mr. BROOKS. Do you think Raytheon will ever get it done?

Dr. BRANSCOMB. The most important step is agreeing that it is needed. If we understand how technology can help us and we are willing to mobilize it to that end, then it will indeed help us. I think that is an excellent example of the application of such techniques.

I obviously cannot comment on what the effect such an analysis would have on the recommended traffic patterns for any two airports. I would comment, however, that there are many such applications that have been demonstrated to result in solutions to problems that were different than the people initially thought subjectively was the right answer.

To cite one example from some work at the Bureau of Standards, we developed, in assistance with local government, a computer program based upon mentioned types of mathematical analysis to help the city of East Lansing, Mich., decide where to build a new fire station. They couldn't build very many and had to make a sensible choice. Our analysis showed that if you understood the problems of fire services and the effective ability of the firetruck to get to the fire as well as where the most important fires were—where the children were in school and where the old folks home was located—you ended up with a different pattern for location of fire stations than people had expected. That technique is being copied in many parts of the country.

Mr. BUCHANAN. You were doing fine until you said that last part, Doctor. I do think that not only in my own bailiwick but because this is such a big problem in New York, Chicago, Atlanta, and many other places, that from the point of view of air safety, as well as convenience to customers passing through, that this ought to be explored.

I am delighted to hear your feeling that this definitely is an application. So far as the results of such an analysis, I would be perfectly content to let the jury decide on that because, as one who passes through Atlanta ad nauseam, Mr. Chairman, personally, I am convinced there must be some better way of getting there than going by way of Atlanta.

Mr. BROOKS. Atlanta is a stop en route to Texas.

Mr. GOLDWATER. I might respond to Mr. Buchanan that I represent an area around Los Angeles which has the second largest and busiest airport in the world. I am sure from looking at it that some of the folks there would be very pleased to give you some of their traffic. I have no questions, but I might say in passing, and I am sure that the chairman would agree, that the testimony of Mr. Branscomb and Dr. Davis are certainly a credit to this administration and a compliment to this Congress and to this committee in its efforts to better understand the use of computers. I certainly enjoyed your testimony. I think it was forthright and very enlightening.

Mr. BROOKS. Doctor, I have one final question.

What is your assessment of the Nation's posture in computer science?

Dr. BRANSCOMB. I wonder if I might refer that to Dr. Davis who is an expert in this discipline.

Dr. DAVIS. Computer science is at the moment a much misunderstood discipline in that computer technology and computer applications have far outpaced computer science. At the moment most of the work that has been sponsored in computer science has been sponsored by the Department of Defense with the three military departments being the first sponsors starting in the early 1950's and the Advanced Research Projects Agency being a major sponsor at the moment.

The other Government agencies that have been major sponsors have been NASA and AEC in more restricted areas. I think it most important to point out that the efforts of the National Science Foundation, which deserve much credit, have been to strengthen academia, because academia is the producer of computer scientists who are going to resolve the technical problems that you have been talking about today.

I think that is important just to bring to this committee's attention the fact that there were no computer science departments in universities before 1965. Since that time we have graduated about 4,000 people with degrees, either bachelors, masters or Ph. D. degrees, in computer science. It is not so important to have such degrees as titles but it is important to recognize that these are the people who are being educated in computer sciences for the purpose of improving computer structures, computer programing languages, computer procedures per se, and not just those who are trying to improve particular applications.

The last point I would like to make here is that if you look at the number, namely, 3,000 to 5,000 people, who have degrees in computer science and correlate that number to the 500,000 people that we can identify as producing programs and software and computer systems in this country, you have a ratio of 500,000 over 3,000. This is about a 500 to 3 ratio, and shows that we have a very, very small ratio of science supporting a very, very large amount of applications. Certainly that reflects the fact that our ability to produce programs has far outstripped our ability to evaluate them or to exercise those necessary quality control procedures.

It is for that reason that the Bureau of Standards is taking such an active role in the development of computer sciences.

Mr. Brooks. Doctor, I thank you and Dr. Davis very much for a fine presentation. At this point in the record would you provide the answers to additional questions of interest to the subcommittee?

(The questions and answers referred to above follow:)

Question No. 1A. What is your assessment of the Nation's posture in computer science?

Answer. A significant portion of the Nation's research in computer science has been funded by the Department of Defense. The Advanced Research Projects Agency has had the most concentrated program in computer science in the DOD. In addition, the Office of Naval Research, the Air Force Office of Aerospace Research, the several centers of the Air Force Systems Command and the Army's Research Office were the first sponsors of computer science in the Government. They have probably had the most long-term impact on the direction of computer science research. This DOD sponsorship and its dominant role has held constant since the mid-1950's. The AEC and NASA have been the most influential agencies other than the DOD in support of computer science research.

The National Science Foundation has had the responsibility within the Government for building up the capability of the Nation's universities and colleges to produce computer scientists and to do research in computer science. The first computer science departments were created only in the mid-1960's. Many of the professors in them have a technological view rather than a scientific view of the nature of computer science. This is expected to change in the 1970's.

In 1964–65, there were 239 college degrees awarded in computer science including data processing, computer science, systems analysis, and related fields. The number of degrees awarded annually has shown steady growth and now, in 1971, we have a small but increasing manpower base capable of contributing to the advance of computer science itself. Now in 1971, we have slightly over 5,000 graduates of computer science departments with bachelor's, master's, and Ph. D. degrees. This manpower base is shown below:

Degree	1964-65	1965-66	1966-67	1967-68	1968-69	Total
BA	87	89	222	459	933	1,790
MA	146	238	449	548	1,012	2,390
Ph. D	6	19	38	36	64	163
Total	239	346	709	1,043	2,009	4,343

Computer science programs	*Amount*
BA programs	51
MA programs	40
Ph. D programs	13
Total programs	104

Computer science has unique ingredients that differ qualitatively from those of traditional disciplines. Computer science is concerned with computer structure, computational structures, and computability. This means that it is concerned with the structure of the computer hardware as a means of handling computational structures. It is vitally concerned with the analysis of algorithms and the characterization of programing languages and systems. It is the science which determines the computability and the unsolvability of functions.

Presently, our ability to produce computers, programing languages, and software computation packages has far outstripped our ability to judge their quality. This is an indicator of an imbalance between science and technology.

For example, we have been looking for expertise in the measurement of software products as they operate on a computer system. There presently appear to be less than a hundred scientists in the whole country concentrated in this area. We have located only three individuals with a Ph. D. degree in this field. And yet, we have some 500,000 computer professionals producing computer software products and running them. The quality assurance problem in the computer field is grave.

Governmental leadership not oriented toward specific departmental missions is urgently needed. It must complement the leadership responsibilities now resident in NSF for building academic capabilities. It is a natural role for the National Bureau of Standards under its organic and Brooks bill statutory authorities.

Question 1B. What is your assessment of the Nation's posture in computer applications?

Answer. Already in 1968, over 1,200 ongoing applications of computers were able to be identified. These were included in the broad subsets of business and manufacturing, administration record keeping, plant and production processing and maintenance operations, banking operations, educational management, instruction and curriculum development, financial record keeping, State, local, and Federal Government applications, hospital administration, patient records and clinical diagnosis, and insurance applications.

Other computer applications are in the fields of law, libraries, law enforcement, laboratory experimentation, military functions, weather prediction, mapping and charting, space operations, and all areas of science and engineering.

In 1968, the Wall Street Journal asked MacKenzie & Co. to assess the experiences with computers of some 20,000 business activities. Eleven percent of the 69.3 percent cooperating organizations were involved in computer services or computer procurement. This amounted to 788 companies. Thirty-one percent of those using computers indicated they were very satisfied with their computer applications. Only 7 percent indicated they were unsatisfied. The greatest dissatisfaction with computer utilization was with the hiring and training of personnel and the time necessary to become operational.

Accounting applications far exceeded others. Sales analysis and inventory control were second runners. These data correspond with similar surveys of the health and education fields where administrative applications far outnumbered diagnostic, instructional or experimental, and instrumentational applications.

It appears safe to surmise that simple administrative record keeping applications constitute the bulk of computer applications today.

Question No. 2. What are the statutory authorities under which the Center for Computer Sciences and Technology operates?

The Brooks bill (Public Law 89-306), section III(f), dated October 30, 1965, authorizes the Secretary of Commerce to provide the scientific and technical services directed toward the objectives of the bill. It also authorizes him to make recommendations relating to the establishment of uniform Federal ADP standards.

The Secretary of Commerce has delegated his authority to the Director, NBS. A statement of this delegation is in the Department of Commerce Order 90–2A of October 1, 1968.

The Center for Computer Sciences and Technology was established to meet these responsibilities and its Director possesses the authorities delegated in turn by the Director, NBS. It was made a line organization reporting to the Director, NBS, by Department Order 90–B of December 11, 1968.

Policy guidance for pursuing DOC responsibilities under the Brooks bill was issued by OMB in a policy guidance letter to the Secretary of Commerce, dated December 15, 1966.

The NBS and therefore the Center for Computer Sciences and Technology operates under the Organic Act of March 3, 1901, establishing the NBS. The act has been amended a number of times, but the especially noteworthy amendments occurred in 1950.

The six primary functions of the NBS under authority delegated by the Secretary are:

(*a*) The custody, maintenance, and development of the national standards of measurement, and the provision of means and methods for making measurements consistent with those standards.

(*b*) The determination of physical constants and properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained with sufficient accuracy elsewhere.

(*c*) The development of methods for testing materials, mechanisms, and structures, and the testing of materials, supplies, and equipment, including items purchased for use of Government departments and independent establishments.

(*d*) Cooperation with other governmental agencies and with private organizations in the establishment of standard practices, incorporated in codes and specifications.

(*e*) Advisory service to Government agencies on scientific and technical problems.

(*f*) Invention and development of devices to serve special needs of the Government.

Question No. 3. How can the Federal ADP standards process be improved to assist the Federal Government in improving ADP services?

Answer. In answering this question, we first need to establish the basic framework for standards and the environment of their application. Then we can relate progress in terms of these aspects.

Standards are designed to facilitate compatibility. The results of standardization should provide for the effective and economic utilization of our ADP resources. Standards, to many, are viewed as the only means of solving the ills of our information processing systems. This definitely is not true. Standards, like any tool, can be rightfully applied or misused. We believe that the major problem deterring progress in this field today is the lack of understanding or appreciation of the proper role of standardization. It is our confirmed belief that standardization is a service function to industry, Government, and the public. The measurement of success of the standards program depends upon the manner in which this service is utilized in the improvement of our ADP capabilities.

The environment that currently exists in the information processing industry is not unlike that experienced by other industries. As you can appreciate, the computer industry is still in an adolescent phase. The mainframe or computer has not changed drastically in the past several years except that its computing power has increased and the cost per computing unit has decreased due primarily to the advancement from vacuum tubes to integrated circuits. Major changes are now occurring in peripheral devices, telecommunications, software, and data organization. Basically, we have reached the stage where we have a powerful computing capability. We are now searching for devices and techniques to make maximum use of this potential.

A major problem in the Federal ADP standards process is the lack of an adequate reporting system on the implementation by Federal agencies of Federal standards. Currently, requests for waivers to Federal standards are coordinated with NBS prior to the granting of such by agency heads. The waiver procedure does not provide a real measure of conformance of Federal computer installations to standards. What is needed is a reporting system where agencies report the extent of standards implementation for each individual system and installation. NBS is recommending that it develop with OMB such a system. Reports would probably be submitted to the Office of Management and Budget. NBS could act as an appeal mechanism regarding technical problems encountered. Also, reporting of standards implementation by agencies should provide sufficient information so that NBS can determine if the standards are responsive to needs, and so that necessary modifications can be made.

Another problem in the Federal ADP standardization process is the length of time taken for standards development and adoption. There are two major aspects that can effect the length of time required to produce standards; namely, technical and administrative considerations. The technical aspect is the lesser of these, but can vary depending upon the complexity of a given standard. The administrative factors include the time required to coordinate and obtain agreements from the various interests including manufacturers and other Government agencies. Improvements in the process are possible if adequate resources are applied and agencies and industry can respond on a more timely basis.

Question No. 4. What do you visualize as the role of teleprocessing or computer networking in computer utilization?

Answer. Computer networking, timesharing, or teleprocessing is already being used for a number of computer applications. Those modes of computer utilization assisted by this new capability include data entry, remote batch processing, remote information retrieval, interactive programing and retrieval, remote printing, data acquisition and control and data exchange.

Self-paced instruction as a means of modernizing our educational process is largely dependent upon computer networking. Computer-aided diagnoses in physicians' offices will use teleprocessing. The maintenance of large welfare and insurance and social-security-type data bases will benefit from remote data entry and remote maintenance of segments of the data bank. One large central office will not have to be created to assume responsibilities for all the myriad of record maintenance and reliability tasks. Decentralization of responsibility will result.

Real time access to data during on-the-job operations can be achieved through teleprocessing. Police can, on CRT's or small printers in their cars, request data from remote facilities. This application is in experimental stages at the present.

Computer customers have available to themselves now the possibilities of trading off additional computers against additional communications. Benefits, of which cost is just one, can be calculated.

Present statistics show over 100 computer networks in operation or close to operational status outside the Federal Government, over 100 commercial timesharing services available and some 20 percent of the Federal computer inventory operating in the teleprocessing mode. All predictions point to increases in this mode of operation. Estimates range from 70 percent to 90 percent of computer utilization being in the network mode by 1975.

Question No. 5. What would be your recommendation regarding the continuation of voluntary ADP standards activities?

Answer. There is no question that the voluntary ADP standards program must continue, and that it must continue to be actively supported by the Federal Government. It is conceivable, of course, that the Government could unilaterally develop and implement its own ADP standards and require that they be met in Federal ADP procurements. But, as we see the growing use of shared computer facilities and the increasing demands for information interchange within and between the public and private sectors, it is obvious that the Federal ADP standards must be consistent with those of the industry and private users. Federal Government participation in the voluntary ADP standards program thus provides the means for including Goverrment requirements in the voluntary standards, and for arriving at uniform standards which can be implemented within the Federal Government in a manner which meets its specific requirements.

Where the primary purpose of our standardization effort has been to provide a more competitive marketplace for the Federal customer, it has also been to serve the public interest, particularly in those areas of standardization which are perhaps less desirable to certain segments of the information processing community, but are of benefit to the community as a whole. There are, of course, weaknesses in the voluntary program; particularly with regard to planning and priorities, and in the area of economic analysis and measurements. We have focused on these problems and have made recommendations in studies underway as to appropriate Government action. In spite of certain weaknesses, I believe that the voluntary ADP standards program, not only must be continued, but must have increased support from both private and public sectors.

It has been the policy of NBS to support voluntary ADP standardization activities, especially those of the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO). It is important that Federal computers and information systems be compatible not only with each other, but also with those of State and local governments, the private sector of the economy and those of other nations. Accordingly, standards developed to meet Federal requirements should, to the extent practicable, be consistent with corresponding ANSI and ISO standards. This should not, however, prevent the Government from (1) adopting standards on its own in cases where ANSI and ISO standards do not exist or are inadequate, nor from (2) modifying ANSI and ISO standards where they do not completely meet Federal requirements, nor from (3) embarking on independent standards development efforts in cases where ANSI and ISO efforts do not exist or are too slow, or are leading to results which will not satisfy the Government's needs.

In this regard, there are some 167 Government representatives from the various Federal departments and agencies participating on voluntary standards groups, particularly on the ANSI committee concerned with computers and information processing (X3), office machines (X4) and library work, documentation, and related publishing practices (Z39). NBS provides 21 participants on these groups. Some Electronic Industries Association (EIA) standards, particularly those dealing with telecommunications interfaces and computer tape, are processed as American National Standards through the X3 committee where they are considered by Government representatives.

In the OMB guidance letter of December 1966, NBS was advised to promote guidance and monitorship of an executive branch program to promote the development and testing of voluntary commercial standards for automatic data processing equipment, techniques, and computer languages.

As a result of this direction and through Government participation, some 30 voluntary standards have been adopted. Three of these have been adopted as Federal standards and five others recommended. The remainder of the ANSI standards are in various phases of consideration or coordination as Federal standards. There are some 70 other standards under development within the technical groups of ANSI.

Question No. 6. How can performance measurement impact on computer utilization?

Answer. The measurement of the performance of computer systems is a very important task. Without such measurement, there is no way to determine precisely what work can be or is being done by a computer system. Both computer customer and manufacturer are plagued by the lack of a meaningful gage or a measurement criterion that will allow a potential customer to intelligently select the make, model, and specific configuration of computer system that will best meet his needs. Not only is it now difficult to specify computers with respect to their required performance, but it is frequently impossible to determine whether or not a given computer system complies with the requirements as stated. This problem occurs repeatedly in the procurement of computer hardware, software, and entire systems.

Based upon past trends, predictions are that 7 percent of the existing 5,277 computers in the Federal inventory will be replaced annually while the inventory will continue to grow at a rate of about 11 percent per year. During fiscal year 1970, for example, there were a total of 893 computer system pro-

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[1] ANSI standards from X3, X4 and Z39 since beginning of standardization efforts.
[2] MICR—Magnetic ink character recognition not considered pertinent.

curements of which 521 were new systems. Clearly, computer system performance measurement methods are essential to both insure the effective selection and utilization of this existing inventory and to realize the optimal cost-effective operation of new systems.

Effort in industry to date has been directed primarily toward the development of tools to measure internal characteristics of computer systems which are judged to have some bearing on overall system performance. These tools include hardware performance monitors which record the extent to which various pieces of hardware are used, software monitors which attempt to record in more detail internal system operation, and software simulators which help to project the effect of changes in system configuration and/or usage patterns. These tools are only first generation computer performance measurement devices. Their application suffers from a lack of knowledge of just when and what to probe to collect meaningful data, and of how to analyze that data to obtain meaningful measures of system performance. Nevertheless, they have been employed in computer installations in the Federal Government and in private industry with some success. Changes made as a result of performance monitoring have led to gains in the efficiency of equipment utilization of 25 percent or more.

Among the important provisions of Public Law 89–306 is the explicit intent to insure—"the economic procurement and effective utilization of ADP equipment"—throughout the Federal Government. This statutory obligation recognizes two specific measurement objectives: procurement and utilization. These two objectives may be further amplified as the requirement to establish evaluation criteria and procedures needed to obtain comprehensive measures of computer system.

NBS established a project directed toward satisfying these requirements in late 1969. The first phase of work undertaken by this project was to conduct a state-of-the-art survey of computer system performance measurement techniques being employed by Government and industry. As a result of this survey, four computer system performance evaluation categories were identified and classified according to the technique employed: simulation, monitoring, analytic, and benchmarking. With respect to these four categories of measurement or evaluation technique, the significant findings of this survey are briefly summarized as follows.

1. Simulation

This is the only technique that provides a means for experimentation with hypothetical computer system configurations. The technique has enjoyed reasonably wide use in the procurement (selection) as well as installation improvement operations in both Government and industry. There are several commercially available simulation packages that may be run on a number of different computers. The principal limitation of this technique is one of accuracy. While it is theoretically possible to construct a simulator that would yield accurate results for all possible system configurations, operating environments, and applications mixes, none of the currently available simulators approach this ideal. Furthermore, the dynamics of computer technology are such that even with a perfect model, the problems of maintaining and verifying a "system and component characteristics" data base appear difficult to accomplish within reasonable cost. As a relatively accurate tool, simulation has usefulness in comparative evaluation situations.

2. Hardware/software monitors

These tools are used to measure system component activities under various modes of system operation. Monitors are employed in system design environments, where such factors as problem time versus supervisor time, I/O channel utilization, et cetera, are evaluated to optimize component utilization and improve system load balancing. Monitors, however, only gather statistics: it is up to an analyst to interpret these statistics and their implications and then to propose optimizing modifications. Most commercially available monitors have associated data reduction software packages to aid in the analysis process. There is a potential use for monitors as a tool in developing or perfecting other measurement techniques of a more predictive nature.

3. Analytic methods

These methods are perhaps the least precise evaluation technique. They employ the use of charts or graphs developed either from analysis or direct measurement of system performance in various application classes. From these charts, estimates of the capabilities of a particular system configuration to perform in similar application areas can be derived by interpolation or extrapolation. In general, these techniques yield accurate results only in special cases where both the system configuration and applications being considered closely match the given charts. Practical use of analytic methods appears limited except as an adjunct to other techniques.

4. Benchmark problems

This has been the most widely used method for evaluating system performance for procurement purposes. Benchmarks, structured to provide a representative sample of the application workload, are used for direct measurement of a systems capability to perform in particular program areas. When the total processing environment is well defined and when time and resources permit, this method of direct measurement is perhaps the most precise. However, with increasingly complex operating environments that include time sharing and multiprograming, it is difficult to establish a representative scaled down work load model—that is, scaled down versions of a set of programs will not necessarily behave the same in these environments as the programs set itself. Consequently, it is difficult and costly to design accurate and representative benchmark problems for these more complex environments. In addition, as a result of this survey it is recognized that a number of other Government agencies, particularly the large ADP users such as DOD, NASA, and AEC have made substantial investments in developing one or more of these four technique categories for internal agency use. However, there is little uniformity in experience, application, or the results obtained by these independent efforts.

NBS is now attempting to consolidate these efforts on a cooperative-voluntary basis by establishing an interagency technical committee as a FIPS task group.

We feel it essential that NBS assume a leadership role in providing a scientifically sound and acceptably accurate set of computer system performance measurement criteria and procedures for uniform application by Government as well as industry.

Question No. 7. How can one achieve a useful inventory of computer software?

Answer. First of all it should be noted that the need for such an inventory has been specifically cited by the GAO, the Interagency Committee on ADP in its reports and at an OMB sponsored Conference on the Management of Computer Systems in the Federal Government in 1970. Statements from a Government Conference in Charlottesville in 1969 conclude:

"A catalog should be developed which would document for the benefit of all Federal agencies, information about * * * the software packages * * * that are currently available.

"Agencies would be helped tremendously by having access to a catalog which described (*a*) the products available; (*b*) the performance factors claimed by the supplier for his products; (*c*) a validation of actual performance; and (*d*) an evaluation of the performance related to specific applications. The development of this catalog should be undertaken immediately."

The NBS has expended considerable effort in attempts to define the scope of such an undertaking and has identified the major problems associated with the many efforts that have been undertaken in selected areas. These can be summarized briefly as follows: What constitutes an acceptable description of a computer program? What is the cost of collecting the descriptions? Who determines whether a program is shareable? What is the minimal useful level of documentation and how can it be specified?

The Center sponsored a study leading to a recommendation for a common format and definition of a minimal set of data elements by which a program must be described to facilitate a decision on its usability by another installation. The resulting report was distributed widely in November 1968, and, along with participation in the ACM Joint Users Group's (JUG) Program Library Committee's attempt to define a mutually acceptable format for its directory, has contributed to the development of a proposed standard by JUG in collaboration with NBS; a specific proposal has been submitted to ANSI X3 committee.

Other problems that had to be resolved were arriving at an agreement on a catalog entry format which would provide information about a program adequate for a potential user to make a reasonable judgment on its applicability to his problem and deciding on a set of categories or classification schemes for grouping the programs.

Through interaction with staff in other agencies with mutual concern, the Center encouraged each agency to initiate planning its own internal inventory and distribution system along lines similar to the NASA ADP resource sharing system for computer programs, operated by the Computation and Analysis Division, Manned Spacecraft Center, in NASA-sponsored Regional Dissemination Centers and the Computer Software Management and Information Center (COSMIC).

The COSMIC project represents one of the best attempts that we know of within the Federal Establishment to collect and disseminate information on programs for sharing NASA's Office of Technology Utilization publishes the quarterly journal "Computer Program Abstracts" which lists available documented computer programs developed by and for NASA, the Department of Defense, and the U.S. Atomic Energy Commission which are offered for sale. DOD began participation in 1968, and AEC programs are contributed from joint efforts of AEC and NASA throught the Space Nuclear Systems Office.

Originally subsidized entirely by NASA, currently the portion of the operation supported by NASA is basically the cost of analyzing the programs to determine their commercial applicability. In 1970, the amount funded for this purpose was approximately $185,000. In 1971, the COSMIC operation is expected to achieve self-supporting status, having recently adjusted prices for programs and documentation to reflect actual costs on the basis of experience over the past 2 years.

COSMIC has provided approximately 24,000 pieces of documentation during its existence from its store of 800 validated programs. The current year's operating budget is $175,000, and will be recovered from the sale of some 2,500 documents and 500 programs. The cost of using the service is the individual charges set for each program and its documentation as listed in the "Computer Program Abstracts" journal published by NASA.

Representative of indexes to commercially available software are the "Business Software Information Service—A Loose Leaf Service," which is published by Business Press International and "Software Packages" and an encyclopedic guide to proprietary packages, updated quarterly, which is published by System Interaction Corporation. In addition, there are such inventories as the "Guide to Computer Services and Software Products," the first edition of which was published in 1969 by G & W Resource Publications, Inc., and "Computer Programs for Chemistry," in three volumes, edited by Delos F. Detar, the Florida State University.

In 1970, the Sterling Institute published an "Index to Computer Assisted Instruction," which was compiled by the Instructional Media Laboratory of the University of Wisconsin at Milwaukee. The programs listed in this catalog were developed in a large part under grants from such agencies as the National Science Foundation, HEW's Office of Education, and the military departments. Another example of a well-known index is the "BMD Biomedical Computer Programs," the first edition of which was issued in 1964, by the Health Science Computing Facility of the School of Medicine, University of California at Los Angeles.

In addition, the related problem of classifying computer programs was addressed in collaboration with the U.S. Patent Office, and the American Patent Law Association's Subcommittee on the Classification of Computer Programs, with participation by representatives of other agencies, industry, and the academic community.

The collection and production efforts associated with a comprehensive inventory of software infer substantial expenditures, not the least of which is the cost of creating a manipulatable data base and providing for continuous updating. The NBS has deferred decision on how best to achieve such an inventory until a cost-benefit analysis can be made. Starting this year, as an interim measure, therefore, the Center has accumulated as comprehensive a collection of available indexes, catalogs, and descriptions of software as possible, from Government activities, user groups, the information industry, and the hardware and software suppliers. This currently amounts to about 60. In order to facilitate responding to the increasing number of requests for identifying program packages for specific applications, keyboarding of the titles and related information of some seven catalogs which contained the most general usable programs has been undertaken to produce a KWIC (keyboard in context) index by the end of this fiscal year.

A one-time comprehensive collection of software information, by direction of the Office of Management and Budget, has been suggested in order to acquire a basis which would be relatively simple to update. The decision for developing such a data base is still pending; it has inherent in it the same problems as discussed earlier, but it would provide a time frame from which it would be reasonable to require the assurance that certain materials such as adequate description and documentation would be prepared henceforth.

Question No. 8. Do you have any indication of the major problems facing ADP customers in the Federal Government?

Answer. Yes; we have some indication of user problems from a variety of sources, but not as much as we would like. A reasonable appraisal is that the old problems such as training and software interchangeability are still with us and are perhaps more complex than they used to be. Other problems that we worried about in the past but hadn't really encountered are now realities. They are here, acute, and complex.

Doing a good job of selecting computer systems is more of a problem than ever. This is a problem across the board for users of computers, and progress in any of the problem areas will impact favorably on the selection problem. Performance measurement and system simulation techniques will be of particular benefit. The present selection practices are unreal in that for the largest Federal customers, selection is reported to take from 18 months to 6 years. This is highly deterrent to the effective utilization of computers and is obviously overburdensome to one of the most important national industries.

Another real problem is the result of a large inventory of second generation equipment possessed by the Federal Government. A real question is whether to invest in improved software for equipment that is essentially obsolete and whether to impose "interface" standards that will require this older generation of equipment to be plug-to-plug compatible with newer peripherals.

Another similar problem is the practice of emulating second generation computer software on third generation hardware. This problem arose when customers bought third generation hardware and found that the software closest at hand consisted of programs that would allow applications packages developed for their old computers to run on their new ones. This is a highly wasteful use of computer hardware. The technical problem is whether to invest in new third generation software or to call the third generation a "lost" generation and concentrate on the future. It, like several of the other problems cited here demands a technological assessment and forecast. We are going to be emphasizing this function at the NBS.

A highly visible, newly acute problem is controlled accessibility to information in data banks. This is a problem that was talked about a few years ago, but it wasn't really a problem then because locking the computer room door was a fair solution. Now, users such as LEAA's Project Search have to satisfactorily solve the problem in order to have a viable law enforcement system. This is a particularly costly problem to solve because the operating system and data base management software available to the user does not usually have data control and security mechanisms which fully satisfy the user's needs. The user has to supplement to the degree that control is lacking and has to interface the data controls with the operating system and supporting software.

As a side thought, this touches on another widespread problem of the shortage of system programers. Some degree of systems programing is required in every problem area. The data control and security problem is an element within two other user problems. One is how to construct an integrated information processing system within the data base concept of linked data elements both between and within files, and the other is how to configure it on a computer network or vice versa. This is a tough one because both are complex problems within themselves, and it appears that quite a few of the systems for which networks are indicated will require evaluating the teleprocessing network concurrently and in conjunction with the information processing requirements and alternatives. This is the type problem the Army faces in automating its medical records system and is primarily a problem of efficiency and economy. Another problem element of this general area is how much redundancy is needed and what procedural techniques are required to insure fail soft. This is particularly important if elements of a data base such as medical records or records of aliens are spread geographically over a computer network. If one computer facility goes down or loses a disk unit, we have to be able to isolate and continue operation of the balance of the system without losing data or maybe more important, without losing data links.

Talking about the data base type system brings to mind yet another related problem and that is the high overhead cost of operating systems and supporting programing aids, particularly the data management systems. Some of our staff are currently consulting with an agency on a typical problem of this type in which the operating system and the data management system require such a large amount of main storage that the batch type applications processing is severely limited during the time that the terminal support system is up. This is at least partially a performance measurement problem and a computer system simulation problem. The ability to dynamically measure systems performance is needed for all multiprogramed computer systems and is particularly indicated for systems supporting terminals. This problem is being experienced by many users who have the need to improve performance with a minimum of resources and is again a problem in which hardware, software, and operating requirements have to be examined as a whole.

Performance measurement techniques will empirically identify performance characteristics. We need to also be able to simulate system changes, using these measured characteristics as a basis, in order to identify what modifications are economically effective. These two abilities together would give us the means to fine tune a system with predictable results, rather than buying more main storage to see if it helps. Hardware modification on a trial and error basis can only be expensive.

Question No. 9. What efforts in standards activities or in software engineering can impact in the near-term on ADP compatibility problems?

Answer. We can consider first the impact on compatibility of an already approved code; namely, the American Standard Code for Information Interchange (ASCII) and its implementation on magnetic and paper tape. The impact presently is most evident on computer time-sharing terminals.

Most of these adhere to the ASCII code. They also comply with the standard character structure and bit sequencing prescribed in other American National Standards. In addition, they comply with an EIA interface standard (RS-232). As a result, most of the common terminals can be used to operate most of the time-sharing systems. This compatibility is being offset somewhat by a trend to higher signaling speeds. Frequently the bit-rate is the only incompatibility between two systems. Many terminals offer a selection of two, three or more bit-rates to accommodate to this trend.

For the first time, many systems, such as the IBM 370 and 360 systems offer conversion packages which allow the input and output of ASCII via communications, or magnetic tapes. In fact, these systems allow a mixture of ASCII and non-ASCII tapes. The NCR Century series of computer uses ASCII as its internal code. Many of the minicomputers also use ASCII as their internal code. So far as we can determine, all of the major vendors are working on all ASCII systems and will probably announce them when the systems standards for code extension are approved by ANSI, ECMA, and ISO.

Adoption of ASCII as a processing code will have a significant effect on program interchangeability. Such interchangeability is hampered now by a variety of codes and their collating sequences. This results in a variety of different responses to computer comparison operations, and a variety of sequences for sort keys containing more than simple numerics, or more than capital letters. Standard practices in coding will offer significant improvements in these areas.

Adoption of ASCII, or a limited number of ASCII subsets, will provide a much greater degree of interchangeability of component devices, such as printers, display terminals, and media handlers. This will allow better reutilization of such equipment in the Government inventory. It will also provide a greater degree of interchangeability of data at the full ASCII or the subset level of ASCII.

The trend toward equipment which has the capability to use the ASCII standards is most pronounced in the case of magnetic tape transports, where the trend toward standard reels, standard tape width, and standard number of tracks and track layout is overwhelming in the Federal Government. Most of the waivers have involved the continued acquisition of seven track tape transports where there was justification. The Internal Revenue Service now has converted its master file to 2,000 reels of one-half inch, nine track, 1,600 character-per-inch tape. This file, although not presently using ASCII code, is sequenced according to FIPS PUB 7, so that it can easily be converted to a completely standard form by a single pass conversion, if that is ever deemed to be important.

A similar trend is noted in perforated tape, so that perforated tapes can now be transferred between competitive or complementary devices to a much gr[illegible]r degree than was true 10 years ago. These perforated tapes are fully standard in all respects. A punched card code has been adopted by ANSI, and half of it, implementing ASCII, is about to become a standard in a FIPS PUB. There has not been any appreciable retrofitting of old equipment, but these standards have been guiding new procurements, which provides the capability to use ASCII in the standard manner, in accordance with the President's directive of March 11, 1968.

A second example of standards and software engineering activities which will impact on ADP compatibility problems is a case of a complex standard where compliance cannot be determined by inspection alone. Some form of validation is needed. This refers to verifying by means of objective measurements that a product or system does in fact comply with the standard.

The most imminent Federal standard in this area is COBOL. In this connection, we are attempting to set up in conjunction with the Department of Defense and with the aid of the Office of Management and Budget and the General Services Administration, a software validation service, the objectives of which are:

1. Enhance program interchangeability by applying Federal standard COBOL uniformly in all Federal ADP installations.
2. Decrease the total effort now expended by the Federal Government in validating COBOL compilers by making all previous test results available for each procurement.
3. Increase the competitiveness of Federal COBOL compiler acquisitions by testing all vendors' products with the same routines and procedures.
4. Provide similar services for State and local governments and the public.

The service would be limited initially to certifying COBOL compilers for compliance with the Federal COBOL standard. It is visualized, however, that additional services regarding other software products would be undertaken later. In this connection, the Navy and NBS have undertaken a joint effort in developing appropriate validation routines for COBOL compilers.

Question No. 10. What are some of the most significant changes in methods of computer utilization by Federal agencies since 1966?

Answer. Changes in computer utilization by Federal agencies closely approximate those in the private sector.

One of the more significant is the attempt to use generalized data management systems to handle data with software that is independent of data codes, files, or applications packages. Another change is the increasing use of high level programing languages. These are languages written to approximate natural language and thus to make it easier for the layman to write computer programs.

A result of these two changes in software practices has been to make computer operating systems, compilers, and the like, more complex and thus to cause the computer to take more time to perform a task. We say that overhead programing and overhead programing costs have increased. Improvements in computer hardware have somewhat alleviated these time and cost increases, but at the expense of cost benefit to the hardware improvements themselves.

Time sharing, computer networking or teleprocessing are all synonyms for the remote use of computers via wire or radio communications. Industry surveys show this to be a major change in mode of computer utilization. It is also considered to be a highly effective means of utilization. Airlines, the banking, securities, retail, credit, health insurance, and mass transit industries are all effecting this type computer utilization. It impacts on computer configurations, operating systems and data communications services. The Government is following suit. The Internal Revenue Service, the law enforcement community, the health care agencies, GSA, and many more are now networking their computer operations.

Another significant change in computer use since 1966 is the use of minicomputers. These are computers that cost less than $50,000. It is interesting to note that minicomputers have more computing capability than did any of the first "large" computers built in the early 1950's. The approximately 600 minicomputers delivered in 1969 will increase to over 30,000 per year by 1971. The Federal inventory of minicomputers is not now counted in the GSA ADP inventory. It will increase from its present level of just under 77 to over 6,000 by 1974. The use of minicomputers will alter procurement practices, change the trend of larger and larger software packages and assist in computer networking. Minicomputer use is also, through its individualization of computer use, expected to impact on the standards practices. So also, of course, is computer networking

(Dr. Branscomb's prepared statement follows:)

PREPARED STATEMENT OF DR. LEWIS M. BRANSCOMB, DIRECTOR, NATIONAL BUREAU OF STANDARDS

Mr. Chairman and members of the subcommittee, I appreciate this opportunity, which is my first, to appear before your subcommittee to discuss the role of the National Bureau of Standards in Federal data processing management and utilization activities.

The purpose of the National Bureau of Standards is to strengthen and advance the Nation's science and technology and to facilitate their effective application for public benefit. In brief, we want to help make American technology strong, useful, and humane.

We strive toward this objective by providing the central basis for compatible measurements throughout science, technology, and commerce and by serving as a central national laboratory, available to all agencies in Government, to assist in the solution of major national problems. A particular class of those problems involves the need to improve the efficiency and effectiveness of the operations of the Government itself. For this purpose an objective, authoritative laboratory with a high level of competence in the physical sciences, mathematics, and engineering can be of enormous value. It must, however, be able to adapt its capabilities and programs to technological change.

There are few areas of American life in which technological change has moved as swiftly as in computer science and technology. In the early years of the development of computers, NBS was able not only to maintain a high level of competence but, in fact, to make some of the pioneering contributions to the technology.

The Standards Eastern Automatic Computer (SEAC) was designed and built at the NBS in the late 1940s. It was the first general purpose, internally sequenced electronic computer in operation in the United States and the only one from 1950 until 1952.

When the computer industry began its explosive growth, two results almost inevitably followed. First, the individual American citizen began to discover that the computer was not only a labor-saving device of enormous value and convenience to him, but it was also a source of frustration and sometimes even fear. Thus, the steadily growing impact of data processing technology on the life of every American made all the more important the ability of Federal Government to insure its own proper use of computer technology and to give watchful attention to the impact of data processing on the welfare of all citizens and the strength of the economy. Second, the Federal Government found that it needed to establish a substantial base of competence not only in the technology of computer hardware, but in the increasingly important problems of computer utilization and application. The foresight of this committee in the preparation of Public Law 89-306 established both the responsibility and the basis for building this competence.

The NBS has the responsibility for responding to national, social, and economic needs through fostering proper application of computer technology as well as to the needs of the Federal Government. For our economic well being as a Nation, we must maintain the vitality of the computer industry whose foreign trade balance accounts for 38 percent of the total U.S. foreign trade balance. We consider equity in the computer marketplace to be advantageous to both the customer and the seller. This is our outlook as we work towards meeting the objectives of the Brooks bill (Public Law 89-306).

Indeed, the Brooks bill (Public Law 89-306) provided the impetus and primary statutory authority for the establishment of the Center for Computer Science and Technology in the National Bureau of Standards. At the time of your last hearings on Data Processing Management in July 1967, the Center was an entity within our Institute for Applied Technology. In 1968, the Center was moved from that institute and made one of the four major line organizations reporting directly to the Director, NBS. This change reflected my predecessor's conviction that computer science and technology were destined to play an evermore important role in meeting the needs of both government and society, and that a substantial increase in NBS capability would be required to respond adequately to this challenge.

When I became Director in September 1969, I reviewed this program, agreed with the prior assessment, and set about to strengthen our plan for increased capability in the future.

In November 1970, Dr. Ruth M. Davis was appointed Director of the Center. She is here with me to answer questions today.

We have maintained and, I believe, we have improved the close productive working relationships with the Office of Management and Budget and the General Services Administration, our partners in implementing Public Law 89-306. Certainly, these three organizations in their combined roles can assist and guide Federal agencies in the computer applications and utilization.

Our goals in computer sciences and technology, which are specific and highly visible examples of our overall goals, bring with them a number of commitments and obligations. However, the resources available to us have forced us to focus on exceedingly modest, short-term goals. Our ability to assist and, when necessary, to influence other Federal agencies has been similarly limited. We have realized that hard choices had to be made with respect to the programs and priorities within the Center for Computer Sciences and Technology. In particular, we have had to be quite selective about the commitments and obligations we could assume. Limited resources make sound planning and critical self-evaluation even more important. We have tried to select those programs which address the most troublesome problems besetting Federal computer users.

In this regard, this subcommittee and OMB have highlighted the importance of ADP standards as a way to resolve problems of incompatibility that exist among equipment, software, and computer-generated data. These incompatibilities can be deterrents to effective utilization of computers. One of the major responsibilities assigned to the NBS has been to recommend Federal standards for computer equipment, techniques, and languages. Standards reflect consensus agreements on how the design, performance, and other characteristics of products, processes, services, and systems are to be described and, when possible, measured. Compatibility among computer equipments is achieved when one set of equipment can accept and process data prepared by another set without having to convert the data or modify its own program. Compatibility among software packages or programs is achieved when the operating system of one computer can run programs written for another (compatible) computer and achieve the same results. Noncompatibility precludes the sharing of software and data among computer facilities.

Finding the remedy for computer hardware and software incompatibility is not an easy task. The data processing industry has moved very swiftly to take advantage of technological advances. The price of achieving increased compatibility must not be the stifling of the opportunity for innovation. Performance based standards can actually promote innovation and fair competition rather than restrict it. The extent to which this will happen depends strongly on the level of technical competence of the organizations responsible for leadership in standardization and the adequacy of the manpower base to insure quick progress.

The NBS has published nine Federal information standards since 1968 which are aimed at reducing incompatibilities. Six of the standards are data standards developed by OMB: one is the American standard code for information interchange (ASCII) standard: and two are implementations of the ASCI character code on magnetic tape and on perforated tape. The latter three are adoptions of the American National Standards Institute (ANSI) standards. There are also International Standards Organization (ISO) counterparts to these three either recommended or in draft stages. Six additional standards have been developed and were submitted to the Office of Management and Budget.

The computer software industry has been growing faster than the computer hardware industry in terms of dollar volume. In 1970, Government expenditures for contract produced software represented 26 percent of the total national expenditure for software. On the other hand, the Government expenditure for computer hardware represented only about 13 percent of the total national expenditure for computer hardware.

This rapid growth of available software products, as well as the Federal Government's increasing dependence on software, have produced problems both for the customer and the seller. For example, a Federal customer attempting to select a data management system for his use is confronted with 157 choices of which only 25 percent have been implemented on more than one manufacturer's line of equipment. Here, I consider a data management system to be a set of software which will handle the agency's data without being tied to a particular set of data codes, data files, or computer application programs. The disparate set of documentation provided with different systems makes ready comparison impossible. The cost of operating the programs, the length of time for them to perform and their ability to actually complete tasks is generally not known by the customer. Almost as frequently these characteristics are not known to the seller.

The customer and the seller would both benefit if there were documentation conventions, measurement tools, performance criteria, and design specifications for software. The NBS is the national resource for providing such measurement services to promote strength in the computer economy and equity for both customer and seller in the computer marketplace. A significant portion of resources—about 36 percent—allocated to the Center for Computer Sciences and Technology since 1966 have been directed to these software problems.

Probably the most dramatic change in computer utilization since 1965 is the remote use of computers. This sharing process is known as teleprocessing, time sharing or computer networking. In 1966, there were fewer than 20 operating teleprocessing systems in the Government. In fiscal year 1970, approximately 20 percent of the computers in the Federal inventory were involved in teleprocessing activities. This is predicted to increase to 60 percent of the Federal inventory in fiscal year 1975.

In one sense, computer networking will decrease the problems of computer system incompatibility through the use of remote terminals to interconnect many customers to one computer facility. Remote terminals are being used here in place of additional separate computer facilities to perform the same tasks. On the other hand, attempts to incorporate computers into service networks have highlighted the grave and costly problems resulting from software incompatibilities. Files produced by one computer facility cannot be processed on another without extensive conversion programs. Incomparable results are often produced by supposedly equivalent software products. Customers and sellers alike are faced with decisions on whether to resolve incompatability in order to use existing systems through communication links or to ignore the problems of incompatibility through constructing more independent individual computer service facilities. These decisions depend upon cost and effectiveness trade-offs.

Providing Federal agencies with leadership in the effective use of software and teleprocessing techniques in a manner consistent with the progressive growth of these industries is a challenge which NBS has accepted under its broad national responsibilities and the specific responsibilities of the Brooks bill.

The NBS intends to continue to fulfill its responsibilities under Public Law 89-306 with heavy emphasis on improved computer utilization via performance measurement and standardization processes, through providing technical support to teleprocessing, and through directed efforts in technical aspects of software product development and management.

Mr. BROOKS. Our next witness represents the Business Equipment Manufacturers Association, under whose auspices the Nation's voluntary computer standards effort is maintained. The so-called X3 Committee of the American National Standards Institute has as its chairman the director of the Data Processing Group of the Business Equipment Manufacturers Association. With us today, representing the association, is Mr. Vico Henriques, director of standards, who, in practical terms, heads up the standards effort within the association.

It is a pleasure to have you with us today, Mr. Henriques, and we welcome you to this hearing.

I would like for you to furnish the subcommittee, for the record, an organization chart outlining the specific projects now underway in the subcommittees of this major effort of yours.

STATEMENT OF VICO E. HENRIQUES, DIRECTOR OF STANDARDS, BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION

Mr. Henriques. We will be glad to do that.

We are in the process of updating our status reports and should have this available in a matter of a week or so.

Mr. Brooks. We would like to have it for this record.

Mr. Henriques. We will have it for you as soon as we can.

Mr. Brooks. In layman terms what would you say was the importance of the computer standards effort insofar as the Government and the Nation generally are concerned?

Mr. Henriques. They are the key to effective use of processing equipment in exchange of data communications and the processing itself. Without standards there is value in automatic data processing, but with standards, that are developed and used it is more likely that the true potential of the ADP systems will be realized. Practically speaking, an effective voluntary standard program can mean a significant increase in the exploitation of the ADP technology across the board. I could only back up here the comments made earlier that the primary applications list over the last two decades has been in fairly simply defined areas such as engineering, some mathematical problems, accounting, banking and statistics. We can, however, see the extension of computer techniques into the areas of Government, environment, legislation, transportation, education, welfare, law, and medicine because standards allow nonprofessional users, that is, people not trained in the computer sciences, to take advantage of the technology.

Mr. Brooks. Regarding participation in the standardization program, in the past the subcommittee has noted evidence on occasion that particular computer and related manufacturers did not wholeheartedly participate in the standards effort. One notable deficiency was the assignment of low echelon individuals to participate in the X3 Committee work.

Do you consider this a continuing problem?

Mr. Henriques. No, Mr. Chairman; I don't. I am pleased to note that the members within the association are fully behind the effort and have made available not only a vast reservoir of technical competence, but have provided management, top management expertise to assist us in the guidance and direction of the program.

Mr. Brooks. What about user participation in the standards effort?

Mr. Henriques. User participation varies with the individuals who are involved, their relationship to the immediate gain from the standard under question, and the current economic situation. We find that we are able to seek new members. We try to maintain a balance in our committee among producers and two kinds of what we call the using community. Some of these are professional societies and the others are particular kinds of industry associations such as air transport and railroads, law, and so on.

The Government sometimes dominates because of their vast interest and their willingness to participate and we seek to enlarge the support from the public sector in the using area at all times.

On occasion we find it difficult because of the lack of organization in a particular field of user interest.

Mr. **Brooks.** Where does the United States stand vis-a-vis the development of standards in Europe and other sections of the world?

Mr. **Henriques.** We have a close relationship with the European Computer Manufacturers Association, which is an international technical body creating such standards. Their effort parallels ours. We get along reasonably well considering the differences in both magnitude and the nature of the problem. Yet we do have a continuing concern about a feeling of pressure on what has been U.S. leadership and participation in the international standards area. These indicate to us that the technologcal advantage the United States has held for the last 2 decades is narrowing and participation is getting tougher.

In recent meetings we have noted that, both from the Iron Curtain countries and Japan, as well as Western Europe, we are getting high-level competence from the technical point of view and considerable push and understanding in the broadening of the horizons for standards.

Mr. **Brooks.** Have you been with Dara Hekimi on that?

Mr. **Henriques.** Yes; he is my counterpart in the European Manufacturers Association; is an old friend and a very capable adversary. Perhaps the adversary nature of the thing sharpens the output. He is a very capable man.

Mr. **Brooks.** Incident to the development of your standards effort, have you developed a definitive definition of the word "standards," and do you differentiate between different types of standardization to meet various types of needs?

Mr. **Henriques.** The answer very much parallels what Dr. Branscomb said. Our effort, in fact, is divided into three major areas, one relating to hardware, one to software, and one to systems. The results from these areas can serve differing needs such as safety, the environmental needs of a computer enclosure or room, procurement specifications, design specifications, and systems standards.

Mr. **Brooks.** Does the industry as you work with them on this standardization seem to understand that if we don't have a better standardization in general terms we are going to be endangering our computer superiority, if we have any now? Do they understand that?

Mr. **Henriques.** I don't think there is any question about their understanding it.

Mr. **Brooks.** Have they met Dara Hekimi?

Mr. **Henriques.** They have met him. The problem is how we understand the workable projects, evaluation of specific proposals that come in. We have formal procedures for the acceptance or initiation of standards projects. These include technological review, measure of economic impact, timeliness, probability of success, and availability of resources. I think we can say that the industry realizes fully its responsibility and its support for the standards effort.

Mr. **Brooks.** When you say they support Mr. Hekimi, you mean they are going to move all their production over there and do it in Europe or Japan and sell it here and close all our manufacturing plants?

Mr. **Henriques.** No, sir; many of the American companies——

Mr. **Brooks**. Some of them are doing just that, you know. Some companies are happily building their plants in Europe and live under the U.S. umbrella of protection.

Mr. **Henriques**. ECMA has as members of its association many of the American companies which are large international concerns. In fact, we note in the Business Equipment Manufacturers Association that very few of our members do not engage in worldwide international commerce. We have followed with great interest the proceedings of the Tariff Commission and the committee concerned with this in the Congress.

The industry is working with the Tariff Commission concerning problems about the tariff laws and regulations and also about certain nontariff trade barriers which may creep in through certification programs.

Mr. **Brooks**. Do they have any representation at the NATO Parliamentarian's Conference that they have in Brussels annually which discusses the details of tariffs and various protection aspects of trade?

Mr. **Henriques**. The industry has no direct representation, but we do serve as friends of the Commission here in the United States which, as I understand it, advises our delegation to this conference.

Mr. **Brooks**. I am serving on the Economic Subcommittee of that NATO Parliamentarian's Conference, and we are working on a report that they will make at the autumn meeting. I have had no input whatsoever from the computer industry, not a line, ever, on this subject.

Mr. **Henriques**. I will be happy to bring in formal written documentation of the position that the industry took relative to some of the problems of tariffing and also our current views closely paralleling those of the electronics industry in Europe on the European certification proposal.

Mr. **Brooks**. Within the United States, I kind of work on those costs and I like to get the costs down and efficiency up. I don't want computer manufacturers leasing equipment to us forever so that we have to pay for it two or three times. My attitude toward them has been a little caustic at times.

But at this time I would like to defend them from being put out of business by foreign competition and I think they ought to be a little more aware of some of those problems. I realize they are all big companies. I don't believe I can see the United States letting them build equipment and parts forever in Europe, or anywhere else, and take all of the domestic market while producing little of it in this country.

There are a lot of industries that seem to be walking down that street pretty fast, if not running.

Mr. **Henriques**. As I said, Mr. Chairman, I will be happy to furnish the formal statement we have made to the Tariff Commission regarding section 807.

Mr. **Brooks**. At this time, does the voluntary standards effort have an ongoing program relating to the so-called peripheral interface?

Mr. **Henriques**. Yes, sir; we do. The technical committee studying the input-output interface problem was started in March of 1967. It is a very highly complex problem and I would prefer to submit a written analysis of this. I think we could say in summary that the technology has changed dramatically since the beginning of this project. There is a problem in identifying those aspects between hardware and software on the interface problem and the identification of particular benefits of this project at this point in time, I think, need to be reevaluated.

Mr. BROOKS. What, if anything, is now underway relating to the development of a unified, independent concept of data management?

At the present time we have all these tapes in Government, and I am sure in business and industry as well, that theoretically contain historical data that can be extracted at will from them. Unfortunately, in many cases, getting a readout of the information on these tapes requires the use of the software program used in the generation of the data, the use of an identical computer that was used to process the data, and considerable detail as to the manner in which the system was designed.

After all, processing data is the name of the game and it would seem to me that when the processing of the data is complete, it should be capable of being stored in a form and format that makes it readily available under circumstances wherein it is fully identifiable more than a week from the time it was put in. You might want to be able to use it next year or 2 years from now.

What are they doing relating to the development of that concept?

Mr. HENRIQUES. The effort in general—when I say the effort in general, I mean including the participants from both sides of the fence; if you will, the producers and users—recognize the need to develop a data management concept.

We have basically identified the areas that need to be worked in. The first of these deals with formats, labels, data structures; the second with the programing languages themselves, documentation as has been mentioned earlier, and communications techniques; the last, the one that was not significantly mentioned before, is the problem of data elements and codes that are used to represent, and are agreed on as conventions, to represent the data.

At the present time, activity in the standards program has at least 23 groups working on various aspects of this problem and on specific standards that relate to each other in the support of the data management concept.

I would prefer, if the committee would agree, to develop a more comprehensive answer and submit it for the record.

Mr. BROOKS. We would be delighted to have that.

What is your reaction to a standard software documentation concept?

Mr. HENRIQUES. We support a standard documentation concept. I think it is necessary to point out that documentation will vary according to the ease of describing the application.

For example, it is relatively easy to document a program that solves a mathematical equation. It is somewhat more difficult to document a payroll system. But the underlying structure, that is the techniques for documentation, certainly denote a unifying convention. We currently have a project in this area that is attempting to define those things that are necessary about documentation in terms of the input, the output, the process, and measures of progress.

Mr. Brooks. You are going to include this, of course, in your outline of the project you now have underway?

Mr. Henriques. Yes.

Mr. Brooks. What is your reaction to the establishment of a national software validation and certification center in the Bureau of Standards to provide a central place for the validation of computer compilers to be used in the Government and to certify as to adherence to whatever standard documentation techniques might be implemented?

Mr. Henriques. We support the concept of a national validation center and, in fact, in several of our committees are working to develop the techniques to be used in such a center. We feel that it would provide a common basis for testing or evaluation. We feel strongly that it will help reduce cost in the procurement effort and can serve as a developmental ground for technology in the kinds of problems Dr. Davis addressed, the development of measurement techniques in the software area.

Mr. Brooks. A year or so ago the Government developed a Federal standard code for information interchange; in other words, a code translating the binary numbers the computer uses into the characters people use. To what extent have the computer and peripheral manufacturers adopted this standard?

Mr. Henriques. I should comment first what the standard is meant to do. The standard serves as a base for implementing the communication between equipments. It is not necessarily an internal code for machine systems or for recording. It provides a full character set to describe informaton or data in files and it contains controls for communication. It is intended to facilitate the exchange of data and is in fact implemented in the major media, that is, magnetic tape, paper tape, and punched cards.

The means for passing information from one system to another can be done through the production of compatible magnetic tapes, paper tape, or punched cards, for which standards do currently exist. The implementation of the code in internal computer circuitry or peripheral circuitry is not quite so broad, but probably is larger than it was 5 years ago. The new technology, using MOS and LSI techniques, solid-state technology, provide easy means of translating from internal codes which, for various reasons, may not be similar to the standard code for data interchange. I would say that in general terms there are few manufacturers who cannot provide compatible interchange media.

Mr. Brooks. Lastly, in an affirmative and constructive sense, do you have any comments relative to the Government's participation in the standards effort and what we can do to make it more effective?

Mr. Henriques. First of all, Mr. Chairman, we are encouraged by the level of participation of Government personnel in the standards area. We sense a need for wider participation from agencies who have not currently been involved in the effort. The primary thrust has come from the Office of Management and Budget, DOD, GSA, NBS, and a couple of specific exceptions in Social Security and the Department of Agriculture.

We would like to see representation of the technical competence that exists in many of the other agencies.

It was alluded to earlier, and we would like to sharpen the need for continuity of representation in terms of both staff and travel. I realize that in the Government there tends to be the fiscal year syndrome, where time and money march in a set of discrete steps, rather than in a nice continuing effort, but it would be encouraging, in our domestic and international areas, particularly where we are not always in control of the schedules for the meetings, to be able to count on the technical input of the Government.

We think the Government can be of major assistance to us at the international level and we look forward to an increasing dialogue between the industry and the Government about mutual problems and about their solution.

Mr. **Brooks**. I want to ask unanimous consent that the witnesses all be given the opportunity to revise and supplement their testimony. Without objection, they will have that opportunity.

Do you have any questions of this witness, gentlemen?

Mr. **Goldwater**. Mr. Chairman, I have one or two questions I would like to ask.

Mr. **Brooks**. Go right ahead.

Mr. **Goldwater**. Mr. Henriques, I was concerned over whether there is some conflict between the Business Equipment Manufacturers Association and the American National Standards Institute.

Mr. **Henriques**. None at all. We support the American National Standards program. In fact, the committees that we do support, X3 and X4, are American National Standards committees. We serve merely as the secretariat function providing administrative and logistic support in terms of papers and the management guidance for these committees.

Mr. **Goldwater**. So there is no conflict between the organizations?

Mr. **Henriques**. None at all. We work under their procedures. The American National Standards Institute attempts not to develop standards in and of its own organization, but finds associations and societies such as ours, the American Society of Mechanical Engineers, or the IEEE to take a specific project under their wing and process them.

Mr. **Goldwater**. Does your association represent software companies also?

Mr. **Henriques**. No, Mr. Goldwater, at the present time, it does not. We obviously have large software competence in our member companies, but membership now is primarily in the area of computers, peripheral devices, components, and supplies.

Mr. **Goldwater**. So when you are speaking of standardization, you are basically talking about equipment?

Mr. **Henriques**. No, I think a definition needs to be made. The standards effort we are talking about includes representation from software companies in the software areas. The manufacturers of the equipment and software in our association work with representatives from software companies and from major users such as the Government and major industrial concerns in the development of software standards. In this sense, it is truly an American National Standards effort, as opposed to a Business Equipment Manufacturers effort.

Mr. **Goldwater**. Does your association feel that the Government is utilizing the experience and knowledge that this industry possesses and the abilities it possesses to its maximum, or do you feel that the Government is preempting the role that perhaps industry should play?

Mr. Henriques. For the first part of the question, it would be difficult to define what a maximum utilization would be. I think that the Government does take advantage, in the best sense of the word, of that which the industry can offer. We participate, for example, with the National Academy of Sciences and National Science Foundation, we assist various commissions and make ourselves available to cooperate whenever possible.

I think the input from the industry is available and is currently being utilized. I don't think that over the last 10 years of the standards effort, we could say that the Government was preempting in any sense. We have had good cooperation from the Government and I think balanced input from them.

Mr. Goldwater. Maybe this is a hypothetical question that one couldn't really respond to. Do you feel that the Government should impose the standards or do you feel these standards should be developed by industry? If you go to another company that has a problem, you look at the problem and you come up with a program or standards to be used. But here we have a Government that tends to solve its own problems and, as you point out, with the utilization of industry, but it comes up with standards to be imposed on industry.

Mr. Henriques. Is there a choice of "none of the above" as an answer? I think it would be safe to say this. Any consumer, any user is free to impose whatever technical specifications he wants in a procurement. Obviously, the Government, with its size, if it decided on an independent standards program, could significantly influence the kinds of standards that would be reflected in equipment and software.

On the other hand, the cooperative effort that has gone on indicates to us that the industry, the manufacturing side of it, should not be the ones to set the standards. We can cooperate and participate and offer our technical expertise, but quite often, standing where we do, we don't see all of the problems in the use and application of the computer to specific problems.

It is in the dialogue, the interchange, the synthesis between the user and the manufacturer that useful standards can be achieved.

Mr. Goldwater. So you are speaking for the manufacturers, in being satisfied that there is a proper balance between Government and industry?

Mr. Henriques. Yes.

Mr. Goldwater. Thank you, Mr. Chairman.

Mr. Brooks. Any questions?

Mr. Buchanan. No; I would say certainly that the Government not only has to be the umpire of some things, but also as your biggest customer, I want to commend you on your wisdom.

Mr. Brooks. Thank you very much for your presentation.

Without objection, the subcommittee stands adjourned.

(Mr. Henriques' prepared statement and additional material for the record follows:)

PREPARED STATEMENT OF VICO E. HENRIQUES, DIRECTOR OF STANDARDS, BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION

BEMA extends its thanks to the chairman and members for the opportunity to review the activities of the national standards program in information processing and to present information on the status of future plans of this program. We welcome the opportunity to appear before the subcommittee again and hope that BEMA can continue to be of service to the information processing community at large and specifically to this subcommittee in its deliberations about the management of ADP resources of the Federal Government. The industry, through BEMA, stands ready to cooperate with the Government in exploring means and standards to provide for better utilization of the Nation's information processing resource and new programs to accelerate the development of tools and techniques for the maximum exploitation of this resource.

Our testimony will bear principally on the activities of BEMA as they relate to the industry support of the national and international standards programs for computers and office machines, related safety standards, and the national metric study. In addition, I will treat briefly BEMA's interface with various elements of the Federal Government on such matters as taxes, foreign trade, procurement policy, data processing/telecommunications relationships, problems of privacy and security, and patenting of computer programs.

The major effort of the national standards activities in information processing is carried on under the American National Standards Institute Committees X3–Computers and information processing, and X4–Office machines. BEMA serves as secretariat for these two committees. The organization, status and accomplishment of these committees is detailed in later paragraphs.

U.S. representation in various international organizations is conducted through BEMA-supported activities. This participation includes: (1) activities in the technical committees of the International Organization for Standardization, (ISO), notably technical committees 95 and 97, office machines and computers and information processing, respectively; (2) the development of U.S. positions for presentation to the technical committees of the International Electrotechnical Commission (IEC), primarily in areas of electrical safety; (3) the liaison representation with the proposed development of certification systems in both ISO and IEC and monitoring the multipartite accord in Western Europe; (4) the technical support of the U.S. Department of State in its participation in activities of the International Consultative Committee on Telephony and Telegraphy (CCITT); (5) the liaison and joint working efforts with the European Computer Manufacturers Association (ECMA).

We will present our understanding of the existing organizational structure for standardization of software and comment briefly on the genesis of various elements of software outside the standards organization.

The Business Equipment Manufacturers Association is composed of a headquarters, product-oriented groups, and several supportive departments. The product-oriented groups are concerned with: (1) data processing including main frames, peripherals, devices, and media; (2) office machines, and (3) office furniture and equipment. Each of these groups maintains a number of committees concerned with various aspects of the industry's interests and relations, including standards, trade telecommunication, privacy and security, Government procurement, patents and copyrights, and so forth. Of particular interest to the subcommittee, would be the organization and activities for the following BEMA committees:

1. The Technical Committee on Computer Environment (TCCE). The scope of TCCE is "to identify and participate in computer environment programs of interest to the BEMA membership and the computing community, collect information to help establish industry position, as distinguished from standards, and serve as the focal point for the exchange of information in related educational efforts." Three subcommittees are currently active:

(*a*) SC1 deals with content of environmental specifications. The scope of this subcommittee is "to identify critical parameters and definitions relevant to computer installation planning and practice, and prepare lists of parameters and definitions and suggest areas for future work."

(*b*) SC2 deals with the coordination of industry activities in matters relating to the internal construction of computers. The scope is "to identify testing laboratory programs and specifications related to safety and fire prevention and suggested areas for detailed analysis and possible industry recommendations."

(*c*) SC3 deals with power interfaces. The scope is "to establish liaison with the Edison Electric Institute (EEI) and other groups, as appropriate, to assist in long-range planning, develop recommended industry positions on environmental considerations in codes and specifications dealing with power requirements."

In addition to this, TCCE supports a liaison relationship with the Underwriters Laboratories in the development of specific domestic standards and test procedures, with the National Fire Protection Association in the writing of the National Fire Code, with the National Electrical Manufacturers Association in the maintenance of the National Electric Code and with the Federal Fire Council to assist in the development of regulations for computer installation. It should be noted that the basic purpose of TCCE is not to develop standards but to present the industry's position in other groups whose purpose is to develop such standards.

2. The BEMA Metric Advisory Committee. This program was undertaken in specific response to a request from the Secretary of Commerce to participate in the national metrics study. As such, the committee has developed expository papers on industry problems concerning metrication in the manufacturing, sale, and use of office machines and data processing equipment. The committee has participated actively in the Engineering Conference and looks forward to continued interaction with the Federal study.

3. As mentioned in my introduction, BEMA has various projects or programs outside the standards area that interface with Federal agencies on a wide range of subjects and differing degrees of effort and participation. These programs and projects receive direction from ad hoc or standing committees composed of member company executives, supported by BEMA staff. In a brief statement for each, I will describe several representative projects or programs.

BEMA has presented to the Internal Revenue Service its comments on the proposed revision to the income tax regulations as they relate to depreciation of expensive leased business machines under the asset depreciation range (ADR) system.

A statement of position on the related subjects of personal privacy and information system security was submitted to the Senate Subcommittee on Constitutional Rights during its recent hearings on "Computers, Data Banks, and the Bill of Rights."

Since 1965 BEMA has participated in the continuing efforts of the Patent Office and the courts to determine the validity of patents on computer programs. The uncertainty in this area continues to hinder "software" development and use, both in Government and industry. BEMA continues to seek final resolution of this important subject.

Beginning in 1967 with the FCC public inquiry into the interdependence of computers and communications, BEMA has been heavily involved in the development and presentation of industry views on this relationship and the establishment of proper boundaries between regulated and unregulated services to the public. The recent final decision in the FCC inquiry (Docket 16-979) affirmed, substantially, the positions presented by BEMA.

While continuing its efforts in the appeals resulting from the final decision in the FCC computer inquiry, BEMA is actively concerned also with matters stemming from or related to the inquiry; such as, free interconnection with the telephone network, specialized common carriers, domestic satellite programs, CATV and other data processing/communications oriented problems.

BEMA submitted a detailed statement to the U.S. Tariff Commission and to the House Ways and Means Committee on the question of repeal of TSUS 806.30 and 807.00. The Commission report was in consonance with BEMA's conclusion that the retention of these items is a net benefit to the U.S. economy.

BEMA has been concerned actively with the development of the multipartite accord, not only to its standards implications, but also for those aspects of the current proposal which would create a substantial nontariff barrier to U.S. exports.

BEMA submitted an initial report of industry views to the U.S. Commission on Government Procurement in November 1970. Since then BEMA has had two committees participating actively in the development of views for the use of the Commission's study groups.

BEMA, through its staff and member company executives, is an active participant in several important Government/industry groups, such as the NAS Computer Science and Engineering Board and its various panels and study groups, and the Conference on Data System Languages (CODASYL) and its subordinate committees.

The Business Equipment Manufacturers Association has accepted the responsibility to serve as secretariat for the American National Standards Institute committees, X3-computer and information processing system, and X4-office machines, and is thus responsible for the organization and operating procedures of these committees. This responsibility covers the guidance and coordination of the development of a body of standards for the data processing community related to systems, computers, equipment, devices, and media for information processing. The goals of this voluntary national standards effort are basically threefold:

To guide the cooperation of all interested factions, including both user and general interest groups as well as manufacturers, in efficient and economic interchange of data and computer programs within and between present and projected information processing systems.

To enhance the national and international marketability utilization, and life expectancy of data processing equipment and systems.

To identify and develop data processing standards necessary to achieve the first two goals in a timely manner and at a minimum cost without in any way inhibiting the face and dynamic technological development of the industry.

In order to accomplish this, BEMA has created an organization which provides management of the standard's projects through the following activities:

Establishment of the goals and schedules and development of a master program.

Overall coordination of the standard's development effort.

Maintaining communication between different development groups.

Auditing and controlling the standard's development effort.

Coordination with regional, national, and international bodies.

Identification of the areas of needs for standards within the data processing environment.

Resolving conflicts between proposed standards and between different development groups.

Insuring the proper balance of involvement from consumers, producers, and general interest areas within the data processing community.

In carrying out these responsibilities, the organization reviews and makes decisions on the technical feasibility of standards proposals, the impact of specific proposals on other standards, proposed or approved, assignment of standards projects to technical committees, establishment of programs of work for these technical committees; maintenance of a set of criteria for measuring technical objectives of the completed standards projects; evaluation of the system considerations which arise on the interrelationship work of the technical committees; and scheduling of the technical work.

The standards development function is organized into technical committees covering the various areas of data processing standardization including recognition, physical media, data representation, documentation, languages, data communication, systems technology, and office machines. In order to process the standards under this organization, it is first necessary that a proposed project meet the criteria for suitability for data processing standardization. This suitability is determined according to the apparent advantages of standardization to all interested groups, the general quality of the proposal, and the appropriateness and timeliness of the proposal.

The need for the standard must clearly be shown to exist or to be reasonably expected to exist. For example, although a proposal might have limited utility as a processing convention, nevertheless there may be an advantage of having a precise definition associated with the name of the convention. The standardization process might be the best method for securing such a definition. Against this apparent need for a standard, must be weighed the disadvantages of standardization at a particular point of time. Again, for example, if the technical area for which the standard is intended is not fully understood, is unstable, is in an emerging sector of the technology, standardization may be premature. Similarly, if the amount of effort and the timelag inherent in producing a standard appear to cancel any advantage, then standardization may well be undesirable. Further, if the standard appears in any way restrictive a thorough examination must be made to assure that no undue advantage or hardship would be created through adoption of the standard.

The following requirements must be met for a proposal to be accepted as a standards project under the BEMA-sponsored activities:

A substantial number of prospective users of the standard exist. The number of prospective users must also be of significant proportion to the number of potential users in the area of application. The smaller the number of potential users in an absolute sense, the greater the required proportion of prospective users in the area of application.

The convention must accommodate a substantial portion of the problems confronting the potential users.

The convention should be compatible with those standards, recommendations, and accepted practices which are considered applicable. Deviations, discrepancies, and new developments must be justified.

If the convention is a language, that language must be such that a processor for the language can be implemented with hardware and software facilities generally available to the potential users.

In short, the standard must serve an appropriate purpose such as:

Covering a previously uncovered area of application. Providing conventions suited to the needs of a particular class of users in an already covered application area.

Improve the technical coverage of an already covered area.

Provide economic advantage for the manufacturer or user.

Provide a combination of features differing from those combinations available in existing conventions or to cover areas of applications not satisfactorily covered by any one existing convention.

It is difficult to imagine that evaluation for standardization would occur without some consideration of intrinsic features. While I will not suggest criteria for such characteristics nor weighting schemes, it is clear the criteria should be utilized or applied somewhat as the following statements would indicate:

The standard should not be needlessly difficult in order to be learned by the intended user.

It should be natural to use the convention in a manner which is easily understandable to the intended user of the convention.

The convention should have no needless arbitrary limitations or exceptions in its rule. While this may be compromised by other requirements, any limitations should be clearly justifiable with respect to such requirements as learning ease, processing efficiency, available capacity, and so on.

Since it is obvious that standards are the creation of human beings, almost all of the standards require maintenance when it becomes apparent that one of the following conditions exists: First, ambiguities or inadequacies are identified. Second, clarifications or interpretations are required. Third, when a standard does not satisfy the criteria. Fourth, when it is desirable to extend or curtail the standard. Fifth, at points and time when it would be appropriate to review the standard in light of changes in policy, passage of time, or its relationship to a developing body of technical knowledge.

Recognizing the need for review and adaptation to current circumstances, BEMA reorganized the domestic standards organization over the last 3 years to reflect more adequately the needs of the information processing community. As a result, within the Committee on Computers and Information Processing, there are three main groups. One deals with hardware standards; one with software standards; and one with systems standards. In the Committee on Office Machines, divisions tend to focus on product lines. There is considerable interaction between the two committees, for example keyboards, codes, credit cards, basic paper forms, and layouts. The accomplishments of these committees are a direct result of vast amounts of technical input, deliberation, argumentation, modification, and compromise. The effort started in 1961, grew slowly at first as the committee established their identity, determined their fields of enterprise and began the work of technical development of standards. I think it is interesting to note that as of the beginning of 1969 there are 36 standards accepted and published, whereas, since then, a total of 37 have been revised or newly created. This indicates the level of effort and direction that these committees have taken. Ten years ago there were seven subcommittees operating under X3. Today, there are 19 technical committees which, with their working groups, comprise some 50 or more separate technical entities. Under the X3 committee there are better than 100 technical projects which may lead to specific standards. In X4, the field is somewhat narrower, there being eight subcommittees. The number of projects in X4 is approximately 30.

Another measure of the level of effort was a recent updating of our membership list to insure inclusion of those currently involved with and unable to participate in this work. We now have on our files as active members or interested observers in all of our activities, more than 1,200 individuals whose contributions have assisted greatly in the development of the standards effort.

In addition to the major efforts of the BEMA-sponsored activities, there are other committees pursuing active and significant technical work under the American National Standards Institute in Information Processing. These include the Committee on Library Work and Documentation, two different committees concerned with drafting, graphic symbols and computer graphics, and related efforts in the areas of scientific instrumentation, process control, and so on. We note with considerable favor the appointment of a new chairman to the Information Processing Systems Technical Advisory Board of ANSI. This board is charged with the overall coordination of all ANSI committees in the area of information processing. Mr. George W. Dodson of the Federal General Services Administration will bring continuing leadership and perspective to this assignment and we welcome the opportunity to work with him.

The domestic effort of the United States is closely parelleled in the international arena through three major organizations. Two of these are broad in their scope. The first is the International Standards Organization (ISO) and the second is the International Electrotechnical Commission (IEC). The third organization, CCITT (the Consultative Committee on International Telephony and Telegraphy), concerns itself with a much narrower area. The United States participates in CCITT through the Department of State. The domestic efforts support the development of U.S. positions and delegations for meetings of these committees and the U.S. holds important secretariat responsibilities for the development of international standards in all areas of information processing and safety.

Our primary international participation is centered in two technical committees of ISO. These are TC 95, office machines, and TC 97, computers and information processing. The organization of these two committees is similar to that of the domestic committees mentioned earlier. The activity level for these committees has been high and is reflected in the annual reports for the year 1971, which are submitted for review and included for the record. Another area of importance is under the IEC Technical Committee 61 on Electrical Safety. Two standards being prepared by this group have a direct bearing on the manufacture of American equipment. These are the specifications related to electrical safety of office machines and of computers. The United States has attempted to maintain its leadership in these areas through the provisions of technical input and secretariat guidance through this committee. There are many other activities which are of general interest to the information processing community in the United States, and relations are maintained with these activities either through participation or through liaison arrangements in order that we may be kept adequately informed and be able to contribute to the work of these organizations. I feel that the future can only bring an increasing awareness of the importance of standards in these areas on a worldwide basis. With this there will be a need for a higher level of participation by the United States in order to maintain its position of technical leadership in the development of standards, in order to assure the American producer and user of the highest degree of compatibility in the systems development for American interest around the world.

We are following with great interest the developments of the certification activities in both ISO and IEC. Such developments strengthen the already obvious need for a vigorous domestic standards activity which can serve as a leader among the national contributions to the development of international standards.

While it is repetitive, it should be stated that both the domestic and international efforts have been greatly assisted by the participation of Federal Government personnel at all levels, from technical task groups through participation as delegates at the highest plenary sessions, by presenting the Government's point of view, and by assisting the national position to be clearly heard and understood in the international councils. We indeed hope that there will be a continued and increasing participation by Federal Government personnel in the areas of technical endeavor leading to data processing standards. The Government activity has also resulted in the adoption of many of these standards by NATO and other inter-Government bodies.

We have heard of this committee's interest in the area of software and offer the following comments about the current organization of the standards activities in software. In its broadest context, there are 23 entities concerned with various aspects of software operating under BEMA support. These include committees concerned with codes, programing languages, communications, data elements, format descriptions, labels, documentation, and so on. Proposals for new projects concerning software are constantly being reviewed in the areas of operating systems control languages, graphic display parameters, and data description. The knitting together of these various elements in full appreciation of their systems implications, is the continuing concern of our major committees. In reviewing the projects, schedules, and accomplishments of the various groups, a list of these accomplishments may seem small in the number of specific standards developed, but when read in the context of an evolving technology and in the contribution that these projects have made in systems and product development throughout the processing community, a true measure of their worth can be felt. The current status of these projects is submitted for review and for the record.

BEMA, through its committees, has also established good working relations, domestically and abroad, with other developmental activities. These include the Committee on Data Systems Languages (CODASYL). We watch with interest the extension and developments to the Cobol language and, particularly, to the Data Base Task Group of the Programing Languages Committee. We will welcome the opportunity to review for standardization whatever their final products may be. In the area of the programing language, there is a vigorous effort being conducted cooperatively between one of the technical committees of X3 and a technical committee of the European Computer Manufacturers Association.

Yet another area of cooperation is in the possible standardization of the programing language, JOVIAL. Since the major interest in the development, use, and maintenance of this language has been in the Department of Defense, it was thought not necessary to create another technical committee to do the basic work in this area. We do, however, anticipate the submission of a proposal from the Department of Defense for a standard for this language in the not too distant future.

The programing language, BASIC, is another example of a path in which a standards proposal may have its initial growing period. This language developed at Dartmouth College, is being considered as a potential candidate for a national standard, with a considerable body of interest by users of teleprocessing systems throughout the United States.

I feel it is safe to say that as we see more of the specific relationships between the information processing and the activities of day-to-day operations in business and Government, more projects can be started to build basic standards. These will allow for the economic and efficient integration of systems activities, measurement of systems performance and interchange of programs and data, so that the maximum possibilities can be made of this country's computer resource, and so that the Federal Government, in its management of its information processing responsibilities, can have the benefit of public and industrial cooperation and knowledge for its own use.

Mr. Chairman, this concludes my opening statement. I will be pleased to answer any questions you may have or to expand any part of the statement.

X3/SSC 92-33
REVISED July 30, 1971

CURRENT ANSI X3 STANDARDS PROJECTS

DATE OF LISTING: JULY 30, 1971

X3 DISCIPLINES

HARDWARE GROUP

- Physical Media Section
- Recognition Section

SOFTWARE GROUP

- Data Representation Section
- Documentation Section
- Languages Section

SYSTEMS GROUP

- Data Communications Section
- System Technology Section

TYPES OF X3 STANDARDS PROJECTS

"S"	Study - Not approved by X3 for Standards Development
"D"	Development
"R"	Revision to Existing published ANSI Standard
"M"	Maintenance of Existing Published ANSI Standard
"L"	Liaison Only - Including International

* NOTE: TYPES "D", "R", "M", "L" MANAGED BY SSC
TYPE "S" MANAGED BY SPARC

* * PROJECTED PUBLICATION DATE BY ANSI

TYPE OF PROJECT	PROJECT NUMBER	PROJECT TITLE	COMMITTEE	REMARKS
		HARDWARE/PHYSICAL MEDIA		
S		NONE		
D	70	Unrecorded Magnetic Tape (200, 800, 1600 CPI)	X3B1	1972*
R	71	X3.14-1969 Recorded Magnetic Tape for Information Interchange (200 CPI, NRZ1)	X3B1	1972*
R	72	X3.22-1967 Recorded Magnetic Tape for Information Inter-Change (800 CPI, NRZ1)	X3B1	1972*
D	73	Recorded Magnetic Tape (1600 CPI, PE)	X3B1	1972*
D	213	Magnetic Tape Cassettes (1/8")	X3B1	1972*
D	221	Magnetic Tape Cassettes (1/4")	X3B1	1973*
D	80	Interchange Rolls for Paper Tape	X3B2	1972*
M	76	X3.18-1967 One Inch Perforated Tape for Information Interchange	X3B2	
M	77	X3.19-1967 Eleven-Sixteenths Inch Perforated Paper Tape	X3B2	
M	78	X3.20-1967 Take-Up Reels for One-Inch Perforated Tape for Information Interchange	X3B2	
M	79	X3.29-1971 Properties of Unpunched Oil Paper Perforator Tape	X3B2	
D	29	Special Purpose Cards	X3B3	
M	101	X3.11-1969 Specifications for General Purpose Paper Cards for Information Processing	X3B3	
M	102	X3.21-1967 Rectangular Holes in Twelve-Row Punched Cards	X3B3	
L	74	Edge Punched Cards ISO/TC97/SC4	X3B4	
D	64	Unrecorded 6-High Disc Pack	X3B7	1972*
D	65	Unrecorded 11-High Disc Pack	X3B7	1973*
D	66	Unrecorded 1-High Disc Pack	X3B7	1973*
		HARDWARE/RECOGNITION		
S		NONE		
R	57	X3.17-1966 Character Set for Optical Character Recognition (Character Extension & Lower Case)	X3A1	1972*

TYPE OF PROJECT	PROJECT NUMBER	PROJECT TITLE	COMMITTEE	REMARKS
R	59	X3.17-1966 Character Set for Optical Character Recognition (ASCII Character Extension)	X3A1	
D	62	Alphanumeric Handprinted Characters	X3A1	1972*
D	61	OCR-B	X3A1	1973*
R	69	X3.17-1966 Character Set for Optical Character Recognition (Print Quality)	X3A1	
M	17	X3.2-1970 Print Specifications for Magnetic Ink Charactor Recognition	X3A7	
M	18	X3.3-1970 Bank Check Specifications for Magnetic Ink Character Recognition	X3A7	
L		NONE		
		SOFTWARE/DATA REPRESENTATION		
S	208	Numeric Conversions	SPARC	
S	203	Representation of Textual Matters	SPARC/TEXT	
S	40	Interchangeable Data Files	SPARC/TTII	
S	42	Collating Sequence	SPARC/TTII	
D	104	Numeric Values	AIICC	1972*
D	3	Graphic Subsets	X3L2	
D	4	Control Codes for 8-Bit Sets	X3L2	
D	5	Graphics for 8-Bit Sets	X3L2	
D	6	Graphics for Control Codes	X3L2	
L	7	Rules for Definition of 4-Bit Subsets ISO/TC97/SC2 & ECMA	X3L2	
L	8	Packed Decimal and Binary Representation ISO/TC97/SC2	X3L2	
M	12	X3.4-1968 Code for Information Interchange	X3L2	
D	13	Registration of Escape Sequences	X3L2	1972*
M	103	X3.26-1969 Hollerith Punched Card Code	X3L2	
D	105	8-Bit Code & Code Extension Procedures	X3L2	1973*
D	106	Candidates for Registry	X3L2	
M	107	X3.6-1965 Perforated Tape Code for Information Interchange	X3L2	
L	108	Codes for Discs ISO/TC97/SC2	X3L2	
D	216	Magnetic Tape Cassette Code	X3L2	
R	38	X3.27-1969 Magnetic Tape Labels For Information Interchange	X3L5	1972*
L	109	Labels for Discs ISO/TC97/SC2	X3L5	
D	217	Magnetic Tape Cassette Label	X3L5	1972*
S	218	Carriage Control	X3L5	

TYPE OF PROJECT	PROJECT NUMBER	PROJECT TITLE	COMMITTEE	REMARKS
D	45	Units of Measurement, Packaging and Count	X3L8	
L	82	Representation for SI Units to be Used in Systems with Limited Character Sets ISO/TC97/WG-K	X3L8	
M	83	X3.30-1971 Representation for Calendar Date and Ordinal Date for Information Interchange	X3L8	
D	84	Representation of Time Elements	X3L8	
D	85	Representation of Universal Time and Time Zones	X3L8	
D	86	Identification of Individuals	X3L8	1972*
D	87	Structure for Identification for Organizations	X3L8	1972*
D	88	Identifiers for Accounts	X3L8	
D	89	Names of Non-Individual and Non-Organization Entities	X3L8	
D	90	Identification of States of U.S.	X3L8	1972*
D	91	Identification of Counties of States of U.S.	X3L8	1972*
D	92	Identification of Cities, Towns, Places of U.S.	X3L8	
D	93	Identification of Point Locations in U.S.	X3L8	
D	94	Identification for Congressional Districts	X3L8	
D	95	Representation of Mailing and Shipping Addresses	X3L8	
D	96	Identification of Countries, Dependencies and Areas of Special Sovereignty of the World	X3L8	1972*
D	97	Identification of Subdivisions of Countries	X3L8	
D	98	Identification of Continents and Water Areas	X3L8	
		SOFTWARE/DOCUMENTATION		
S	219	Machine Sensible Program Descriptions	SPARC	
S	211	Standard Program Abstracts	SPARC/DOCM	
D	16	Project Documentation	X3K1	
M	81	X3.5-1970 Flowchart Symbols and Their Usage in Information Processing	X3K2	

TYPE OF PROJECT	PROJECT NUMBER	PROJECT TITLE	COMMITTEE	REMARKS
D	23	Alphanumeric Presentation	X3K3	1972* (in Project #62)
D	214	Format Description	X3K4	
L	27	ISO Vocabulary of Data Processing ISO/TC97/SC1	X3K5	
M	25	X3.12-1970 Vocabulary for Information Processing	X3K5	
D	26	Dictionary	X3K5	1971*
D	31	Network Glossary	X3K6	
D	32	Graphical Representation of Networks	X3K6	
D	36	Networks Oriented Computer System Guide	X3K6	
R		NONE		

SOFTWARE/LANGUAGES

TYPE OF PROJECT	PROJECT NUMBER	PROJECT TITLE	COMMITTEE	REMARKS
S	207	Data Syntax Language	SPARC	
S	215	BASIC	SPARC/BASC	
S	202	Operating System Control Languages	SPARC/OSCL	
D	212	PL/I	X3J1	1973*
R	67	X3.9-1966 FORTRAN	X3J3	1973*
R	68	X3.10-1966 Basic FORTRAN	X3J3	1973*
D	20	COBOL Audit Routines	X3J4	1973*
R	22	X3.23-1968 COBOL	X3J4	1973*
D	55	APT	X3J7	
D	115	APT Post Processor	X3J7	
D	30	ALGOL	X3J8	
M		NONE		
L		NONE		

SYSTEMS/DATA COMMUNICATIONS

TYPE OF PROJECT	PROJECT NUMBER	PROJECT TITLE	COMMITTEE	REMARKS
S		NONE		
D	28	Systems Performance	X3S3	1972*
D	47	Heading Format for Data Transmission	X3S3	
R	48	X3.28-1971 Procedures for the Use of the Communication Control Characters of American National Standards Code for Information Interchange in Specified Data Communication Links	X3S3	1972*
D	49	Code Independent Control Procedures	X3S3	

TYPE OF PROJECT	PROJECT NUMBER	PROJECT TITLE	COMMITTEE	REMARKS
D	50	Network Control Procedure	X3S3	
D	51	Wideband Data Transmission Signaling Rates	X3S3	1972*
M	110	X3.1-1969 Synchronous Signaling Rates for Data Transmission	X3S3	
M	111	X3.15-1966 Bit Sequencing of ASCII in Serial-by-Bit Data Transmission	X3S3	
M	112	X3.16-1966 Character Structure and Character Parity Sense for Serial-by-Bit Data Communication in ASCII	X3S3	
M	113	X3.24-1968 Signal Quality at Interface Between Data Processing Terminal Equipment & Synchronous Data Communication Equipment for Serial Data Transmission	X3S3	
M	114	X3.25-1968 Character Structure & Character Parity Sense for Parallel-by-Bit Communication in ASCII	X3S3	
L		NONE		

SYSTEMS/SYSTEM TECHNOLOGY

TYPE OF PROJECT	PROJECT NUMBER	PROJECT TITLE	COMMITTEE	REMARKS
S	204	Display Parameters	SPARC/DISP	
D	52	Channel Interface-Functional	X3T9	
D	53	Channel Interface-Electrical	X3T9	
D	54	Channel Interface-Mechanical	X3T9	
R		NONE		
M		NONE		
L		NONE		

X3/SSC 198
JULY 30, 1971

PUBLISHED & PROJECTED TO BE PUBLISHED ANSI X3 STANDARDS

1962 - 1973

TITLE	PUBLISHED		PROJECTED			REMARKS
	ANSI NUMBER	ANSI APPROVAL DATE	X3 PROJECT NUMBER	X3 APPROVAL DATE	ANSI APPROVAL DATE	
HARDWARE/PHYSICAL MEDIA						
Specifications for General Purpose Paper Cards for Information Processing	X3.11-1966	Mar 1966				R1681 (1970)
Specifications for General Purpose Paper Cards for Information Processing	X3.11-1969	Oct 1969				R1681 (1970)
Recorded Magnetic Tape for Information Interchange (200 CPI,NRZ1)	X3.14-1969	1969				DR1862
One-Inch Perforated Paper Tape for Information Interchange	X3.18-1967	Mar 1967				R1154 (1969)
Eleven-Sixteenths Inch Perforated Paper Tape	X3.19-1967	Apr 1967				
Take-Up Reels for One-Inch Perforated Tape for Information Interchange	X3.20-1967	Aug 1967				
Rectangular Holes in Twelve-Row Punched Cards	X3.21-1967	Aug 1967				DR1682

NOTE: R = Published ISO Recommendation
DR = ISO Draft Recommendation

TITLE	PUBLISHED		PROJECTED			REMARKS
	ANSI NUMBER	ANSI APPROVAL DATE	X3 PROJECT NUMBER	X3 APPROVAL DATE	ANSI APPROVAL DATE	
Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI)	X3.22-1967	Nov 1967				R962 (1969)
Properties of Unpunched Oiled Paper Perforator Tape	X3.29-1971	May 1971				DR1729
Revision of X3.14-1969 Recorded Magnetic Tape for Information Interchange - 200 CPI, NRZI			71	1972		DR1862
Revision of X3.22-1967 Recorded Magnetic Tape for Information Interchange - 800 CPI,NRZI			72	1972		DR1863
Recorded Magnetic Tape 1600 CPI,PE			73	1972		
Unrecorded Magnetic Tape 200, 800 CPI NRZI and 1600 CPI, PE			70	1972		DR1864
Unrecorded 6-High Disc Pack			64	1972		
Magnetic Tape Cassette (1/8")			213	1972		
Interchange Rolls for Paper Tape			80	1972		DR2195
Unrecorded 11-High Disc Pack			65	1973		
Unrecorded 1-High Disc Pack			66	1973		
Magnetic Tape Cassette (1/4")			221	1973		

NOTE: R = Published ISO Recommendation
DR = ISO Draft Recommendation

TITLE	PUBLISHED		PROJECTED			REMARKS
	ANSI NUMBER	ANSI APPROVAL DATE	X3 PROJECT NUMBER	X3 APPROVAL DATE	ANSI APPROVAL DATE	
HARDWARE/RECOGNITION						
Print Specifications for Magnetic Ink Character Recognition	X3.2-1963	Nov 1963				R1004 (1969)
Print Specifications for Magnetic Ink Character Recognition	X3.2-1970	Oct 1970				R1004 (1969)
Bank Check Specifications for Magnetic Ink Character Recognition	X3.3-1963	Nov 1963				
Bank Check Specifications for Magnetic Ink Character Recognition	X3.3-1970	Oct 1970				
Character Set for Optical Character Recognition	X3.17-1966	July 1966				R1073 (1969)
Revision of X3.17-1966 Character Set for Optical Character Recognition - Character Extension and Lower Case			57	1972		R1073 (1969)
Alphanumeric Handprinted Characters			62&23	1972		
OCR-B			61	1973		R1073 (1969)
SOFTWARE/DATA REPRESENTATION						
Code for Information Interchange	X3.4-1963	June 1963				R646 (1967)
Code for Information Interchange	X3.4-1965	Dec 1965				R646 (1967)

NOTE: R = Published ISO Recommendation
DR = ISO Draft Recommendation

TITLE	PUBLISHED		PROJECTED			REMARKS
	ANSI NUMBER	ANSI APPROVAL DATE	X3 PROJECT NUMBER	X3 APPROVAL DATE	ANSI APPROVAL DATE	
Code for Information Interchange	X3.4-1967	July 1967				R646 (1967)
Code for Information Interchange	X3.4-1968	Oct 1968				R646 (1967)
Flowchart Symbols and Their Usage in Information Processing	X3.5-1970	Sept 1970				R1028 (1969)
Perforated Tape Code for Information Interchange	X3.6-1965	July 1965				R1113 (1969)
Hollerith Punched Card Code	X3.26-1969	Jan 1969				R1679 (1970) &
Magnetic Tape Labels for Information Interchange	X3.27-1969	Oct 1969				R1001 (1969)
Representation for Calendar Date and Ordinal Date for Information Interchange	X3.30-1971	July 1971				R2014 (1971) R2015 (1971)
Reaffirmation of X3.6-1965 Perforated Tape Code for Information Interchange			107	1971		R1113 (1969)
Registration of Escape Sequences			13	1972		DR2375
Magnetic Tape Cassette Label			217	1972		
Revision of X3.27-1969 Magnetic Tape Labels for Information Interchange			38	1972		R1001 (1969)
Representation of Numeric Values			104	1972		
Identification of Individuals for Information Interchange			86	1972		
Structure for Identification of Organizations for Information Interchange			87	1972		

NOTE: R = Published ISO Recommendation
DR = ISO Draft Recommendation

TITLE	PUBLISHED		PROJECTED			REMARKS
	ANSI NUMBER	ANSI APPROVAL DATE	X3 PROJECT NUMBER	X3 APPROVAL DATE	ANSI APPROVAL DATE	
Identification of Countries, Dependencies, and Areas of Special Sovereignty of the World for Information Interchange			96	1972		
Identification for States of U.S.			90	1972		
Identification of Counties of States of U.S.			9	1972		
8 Bit Code and Code Extension Procedures			105	1973		
SOFTWARE/DOCUMENTATION						
Flowchart Symbols and Their Usage in Information Processing	X3.5-1968	May 1968				R1028 (1969)
Flowchart Symbols and Their Usage in Information Processing	X3.5-1970	Sept 1970				R1028 (1969)
Vocabulary for Information Processing	X3.12-1966	June 1966				DR2382, 238 2452, 245
Vocabulary for Information Processing	X3.12-1970	Feb 1970				DR2382, 238 2452, 245
Dictionary for Information Processing			26	1971		DR2382, 238 2452, 245

NOTE: R = Published ISO Recommendation
DR = ISO Draft Recommendation

TITLE	PUBLISHED		PROJECTED			REMARKS
	ANSI NUMBER	ANSI APPROVAL DATE	X3 PROJECT NUMBER	X3 APPROVAL DATE	ANSI APPROVAL DATE	
SOFTWARE/LANGUAGES						
FORTRAN	X3.9-1966	Mar 1966				DR1539
Basic FORTRAN	X3.10-1966	Mar 1966				DR1539
COBOL	X3.23-1968	Aug 1968				DR1989
Revision X3.23-1968 COBOL			22	1973		
Revision X3.9-1966 FORTRAN			67	1973		
PL/I			212	1973		
COBOL Audit Routines			20	1973		
Revision X3.10-1966 Basic FORTRAN			68	1973		
SYSTEMS/DATA COMMUNICATIONS						
Signaling Speeds for Data Transmission	X3.1-1962	Aug 1962				
Synchronous Signaling Rates for Data Transmission (Replaces X3.1-1962 & X3.13-1966)	X3.1-1969	Aug 1969				
Parallel Signaling Speeds for Data Transmission (See X3.1-1969)	X3.13-1966	June 1966				
Bit Sequencing of the USA Standard Code for Information Interchange in Serial-by-Bit Data Transmission	X3.15-1966	Aug 1966				

NOTE: R = Published ISO Recommendation
DR = ISO Draft Recommendation

TITLE	PUBLISHED ANSI NUMBER	 ANSI APPROVAL DATE	PROJECTED X3 PROJECT NUMBER	 X3 APPROVAL DATE	 ANSI APPROVAL DATE	REMARKS
Character Structure and Character Parity Sense for Serial-by-Bit Data Communication in the USA Standard Code for Information Interchange	X3.16-1966	Aug 1966				R1177 (1970)
Signal Quality at Interface Between Data Processing Terminal Equipment and Synchronous Data Communication Equipment for Serial Data Transmission	X3.24-1968	Sept 1968				
Character Structure and Character Parity Sense for Parallel-by-Bit Communication in the American National Standard Code for Information Interchange	X3.25-1968	Sept 1968				
Procedures for the Use of the Communication Control Characters of National Standard Code for Information Interchange in Specified Data Communication Links	X3.28-1971	Mar 1971				R1745 (1971)

NOTE: R = Published ISO Recommendation
DR = ISO Draft Recommendation

TITLE	PUBLISHED		PROJECTED			REMARKS
	ANSI NUMBER	ANSI APPROVAL DATE	X3 PROJECT NUMBER	X3 APPROVAL DATE	ANSI APPROVAL DATE	
Revision of X3.28-1971 Procedures for the Use of the Communication Control Characters for the Use of the Communication Control Characters of ANS Code for Information Interchange in Specified Data Communication Links			48	1972		R1745 (1971)
Systems Performance			28	1972		
Wideband Data Transmission Signaling Rates			51	1972		
EIA/MACHINE TOOL CONTROL						
Interchangeable Perforated Tape Variable Block Format for Positioning & Straight Cut Numerically Controlled Machine EIA RS 273-A - (Now Called X8.3-1968)	X3.7-1965	Mar 1968				R1057 (1969)
Interchangeable Perforated Tape Variable Block Format for Contouring & Contouring/Positioning Numerically Controlled Machines EIA RS 274-B (Now Called X8.2-1965)	X3.8-1965	Mar 1968				

NOTE: R = Published ISO Recommendation
DR = ISO Draft Recommendation

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1971-3-22

TO: P Members
O Members
Liaison Organization and
ISO Council Members

ISO/TC 97 Computers and Information Processing

Secretariat: USA (ANSI)

We are pleased to send you the Annual Report for ISO/TC 97 Computers and Information Processing for the Year ending December 31, 1970.

Sincerely,

Daniel W. Smith
Daniel W. Smith
For the Secretariat,
ISO/TC 97

DWS:dg

RECEIVED
MAR [illegible] 1971
BEMA/STDS

ISO/TC 97 (Secretariat -299)
February 1971

I S O

International Organization for Standardization

Report on the Work of Technical Committee ISO/TC 97 - Computers and Information Processing for the Year 1970

I. ISO/TC 97 Plenary Committee

Scope: Standardization of the terminology, problem description, programming languages, communication characteristics, input-output, and physical (non-electrical) characteristics of computers and data processing devices, equipments and systems.

Secr: United States of America, American National Standards Institute

Participation:

(P) Member Bodies

Australia
Brazil
Canada
Czechoslovakia
Denmark
France

Germany
Italy
Japan
Netherlands
Poland
Spain

Rumania
Sweden
Switzerland
United Kingdom
USA
USSR

(O) Member Bodies

Austria
Belgium
Chile
Columbia
Greece
Hungary

India
Iran
Ireland
Israel
New Zealand
Norway

Pakistan
Portugal
Republic of South Africa
Turkey
Yugoslavia
Bulgaria

Liaison: **Liaison with ISO and IEC Technical Committees**: **ISO/TC 6, Paper, Board and Pulps; ISO/TC 37, Terminology (Principles and Coordination); ISO/TC 39, Machine-Tools; ISO/TC 46, Documentation; ISO/TC 68, Banking; ISO/TC 95 Office Machines; IEC/TC 44, Electrical Equipment of Machine Tools**; IEC/TC 67, Analogue Computing Equipment

Liaison with International Organizations:

Association Europeenne des Fabricants de Machines de Bureau (AAEEB)
Centre d'Etudes et de Recherches de la Machine-outil
Comite Permanent des Congress Internationau d'Actuaires (CPCIA)
European Association of the Business Machines Industry (EFMB)
European Computer Manufacturers Association (ECMA)
Federational Internationale de Documentation (FID)
International Air Transport Association (IATA)
International Atomic Energy Agency (IAEA)
International Electrotechnical Commission Central Secretariat (IEC)
International Federation for Automatic Control
International Federation for Information Processing (IFIP)
International Press Telecommunications Committee (IPTC)
International Radio Consultative Committee (CCIR)
International Telegraph and Telephone Consultative Committee (CCITT)
Union Internationale des Chemins de Fer (UIC)
Union Internationale des Telecommunications (UIT)
Universal Postal Union (UPU)
World Meteorological Organization (WMO)

II. SUBCOMMITTEES AND WORKING GROUPS:

2.1 SC 1 Vocabulary

Scope: To provide a multilingual glossary for information processing systems and related subjects covered in the general scope of ISO/TC 97 and, where appropriate, abbreviations and letter symbols.

Secr. France (AFNOR)

(P) Member Bodies: France, Germany, Japan, Netherlands, Poland Rumania, Spain, Sweden, UK, USA

(O) Member Bodies: Australia, Austria, Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, Hungary, Israel, Italy, Norway, Portugal, Republic of South Africa

Liaison: International Atomic Energy Agency (IAEA)
European Computer Manufacturers Association (ECMA)
International Federation for Information Processing
Union Internationale des Chemins de Fer (UIC)
International Telegraph and Telephone Consultative Committee (CCITT)
Universal Postal Union (UPU)
ISO/TC 37, Terminology
ISO/TC/95, Office Machines
IEC Central Secretariat
ISO/TC97/SC2; ISO/TC97/SC3; ISO/TC97/SC4; ISO/TC97/SC5; ISO/TC97/SC6; ISO/TC97/SC7; ISO/TC97/SC8
World Health Organization (WHO)

2.1.1 SC 1 - Working Group 1 - Vocabulary Maintenance

Scope:

a) To maintain in an up-to-date condition the completed sections of the ISO Vocabulary of Information Processing, i.e. those sections which have been passed by Subcommittee ISO/TC97/SC1 for further processing as draft recommendations.

b) To recommend to Subcommittee ISO/TC 97/SC 1 any necessary additions to, changes in, and deletions from the completed sections.

c) To consider methods by which mechanical or electronic aids may be used in the preparation of successive updated versions of these sections, and to make such use of these aids as may be considered appropriate.

Secr: USA (ANSI)

(P) Member Bodies: France, Germany, USA

(O) Member Bodies: None

Liaison: None

2.2 SC 2 - Character Sets and Coding

Scope: The standardization of character sets, character meanings, the grouping of character sets into information, coded representation and the identification of it for the interchange of information between data processing systems and associated equipments, also to report on the problems related to analog devices, taking into account the need for error checking.

Secr: France (AFNOR)

(P) Member Bodies: France, Germany, Italy, Japan, Netherlands, Rep. of South Africa, Rumania, Spain, Sweden, Switzerland, UK, USA

(O) Member Bodies: Australia, Austria, Belgium, Canada, Denmark, Hungary, Israel, Norway, Poland, Portugal

Liaison: International Atomic Energy Agency (IAEA); European Computer Manufacturers Association (ECMA); International Telegraph and Telephone Consultative Committee (CCITT); International Press Telecommunication Committee (IPTC); Union Internationale des Chemins de Fer (UIC); Universal Postal Union (UPU); ISO/TC 39, Machine-Tools; ISO/TC 46/SC 2, Conversion of Written Languages; ISO/TC 95, Office Machines; ISO/TC 97/SC 1, Vocabulary; ISO/TC 97/SC 3, Character Recognition; ISO/TC 97/SC 4, Input-Output; ISO/TC 97/SC 5, Programming Languages; ISO/TC 97/SC 6, Digital Data Transmission; ISO/TC 97/SC 8, Numerical Control of Machine Tools; IEC/TC 67, Analogue Computing Equipment.

2.3 SC3 - Character Recognition

Scope: The standardization of input and output character forms for the interchange of information between data processing equipments and associated equipments utilizing only humanly-legible printed character sets, i.e. character recognition.

Secr: USA (ANSI)

(P) Member Bodies: France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, UK, USA, USSR

(O) Member Bodies: Australia, Austria, Belgium, Bulgaria, Canada, Denmark, Hungary, Israel, Norway, Poland, Portugal

Liaison: European Computer Manufacturers Association (ECMA); Union Internationale des Chemins de fer (UIC); Universal Postal Union (UPU); ISO/TC 95, Office Machines; ISO/TC 95/SC 6, Mail Processing Machines and Special Machines

2.3.1 SC 3 Working Group 1 - Optical Character Recognition

Secr: Switzerland (SNV)

(P) Member Bodies: France, Germany, Italy, Japan, Netherlands, Sweden, Switzerland, UK, USA, USSR

(O) Member Bodies: Australia

Liaison: European Computer Manufacturers Association (ECMA); Union Internationale des Chemins de Fer (UIC); Union Postale Universelle (UPU); ISO/TC 6/SC 2/WG 1, Optical Properties of Paper and Pulp

2.3.2 SC 3 Working Group 2 - Magnetic Ink Character Recognition

Secr: Belgium (IBN)

(P) Member Bodies: Belgium, France, Germany, Italy, Netherlands, Switzerland, UK, USA

(O) Member Bodies: Australia

Liaison: European Computer Manufacturers Association (ECMA); Union Internationale des Chemins de fer (UIC); Federation Internationale de Documentation (FID); International Electrotechnical Commission (IEC); International Federation for Information Processing (IFIP); International Telegraph & Telephone Consultative Committee (CCITT); Universal Postal Union (UPU); IEC/TC 53/SCD

2.4 SC 4 - Input/Output

Scope: The standardization of those physical characteristics of input-output media which are required for the interchange of digital and/or coded information among information processing systems and systems of associated equipment.

Secr: Italy (UNIPREA)

(P) Member Bodies: Brazil, France, Germany, Italy, Japan, Netherlands, Romania, Spain, Sweden, Switzerland, UK, USA, USSR

(O) Member Bodies: Australia, Austria, Belgium, Canada, Czechoslovaia, Denmark, Hungary, Israel, Norway, Poland, Portugal, Republic of South Africa

Liaison: European Computer Manufacturers Association (ECMA); International Telegraph and Telephone Consultative Committee (CCITT); Union Internationale de Chemins de Fer (UIC); Universal Postal Union (UPU); ISO/TC97/SC1, Vocabulary; ISO/TC97/SC2, Character Sets and Coding

2.4.1 SC 4 Working Group 1 - Magnetic Tape

Scope: The standardization of those physical characteristics of input/output media which are required for the interchange of information among data processing systems and systems of associated equipment, in the field of digital magnetic recording.

Secr: USA (ANSI)

(P) Member Bodies: Czechoslovakia, France, Germany, Italy, Japan, Netherlands, Poland, Switzerland, UK, USA, USSR,

(O) Member Bodies: Australia, Belgium, Spain

Liaison: European Computer Manufacturers Association (ECMA); IEC/TC 60, Recording; ISO/TC 97/SC 2, Character Sets and Coding; ISO/TC 97/SC 4/WG 5, Instrumentation Tapes; ISO/TC 97/SC 8 Numerical Control of Machines.

2.4.2 SC 4 Working Group 2 - Punched Cards

Scope: The standardization of those characteristics of input/output media which are required for the interchange of information among data processing systems and systems of associated equipment, in the field of punched card.

Secr: France (AFNOR)

(P) Member Bodies: Czechoslovakia, France, Germany, Italy, Japan, Poland, UK, USA, USSR

(O) Member Bodies: Australia, Belgium, Netherlands, Spain, Sweden, Switzerland

Liaison: European Computer Manufacturers Association (ECMA); Federation Internationale de Documentation (FID); International Electrotechnical Commission (IEC); International Federation for Information Processing (IFIP); International Telegraph and Telephone Consultative Commission (CCITT); Union Internationale des Chemins de fer (UIC); Universal Postal Union (UPU) ISO/TC 6; ISO/TC 97/SC 1; ISO/TC 97/SC 2

2.4.3 SC 4 Working Group 3 - Punched Tape

Scope: The standardization of those characteristics of punched tape which are required for the interchange of information among data processing systems and systems of associated equipment.

Secr: Italy (UNIPREA)

(P) Member Bodies: Czechoslovakia, Fracne, Germany, Italy, Japan, Poland, Switzerland, UK, USA, USSR

(O) Member Bodies: Australia, Belgium, Canada, Spain

Liaison: European Computer Manufacters Association (ECMA); Union Internationale des Chemins de Fer (UIC); International Electotechnical Commission (IEC); ISO/TC 6, Paper, Board, and Pulps; ISO/TC6/SC2, Test Methods and Quality Specifications for Paper and Board; ISO/TC 39, Machine Tools; ISO/TC97/SC2, Character Sets and Coding; ISO/TC97/SC4/WG4, Input-Output Equipment; ISO/TC97/SC4/WG6, Magnetic Disk Packs; ISO/TC97/SC6, Digital Data Transmission; ISO/TC97/SC8, Numerical Control of Machines

2.4.4 SC 4 Working Group 4 - Input-Output Equipment

Scope: Standardization of characteristics of input/output equipments, necessary for their interchangeability and intercommunication in digital information processing systems, including central processing equipments at the interface.

Secr: Germany (DNA)

(P) Member Bodies: Czechoslovakia, France, Germany, Italy, Japan, Netherlands, Sweden, Switzerland, UK, USA

(O) Member Bodies: Australia, Austria, Belgium, Spain

Liaison: ISO/TC 95, Office Machines; IEC/TC 65 Process Control

2.4.5 SC 4 Working Group 5 - Instrumentation Tapes

Scope: Standardization of the terminology, magnetic tape physical and magnetic properties, magnetic tape test methods, recording formats, reels and those characteristics of input/output equipment as required to interchange media between systems and equipment utilized in reel-to-reel magnetic tape instrumentation applications.

Instrumentation applications in this connection are defined as applications in the general field of data recording except those purely digital applications relating to data interchange between computers, e.g., those using tapes defined by SC 4/WG 1.

Secr: USA (ANSI)

(P) Member Bodies: Belgium, France, Germany, Japan, UK, USA, USSR

(O) Member Body: Czechoslovakia, Italy

Liaison: ISO/TC 97/SC 4/WG 1, Magnetic Tape; European Computer Manufacturers Association (ECMA) IEC/TC 60

2.4.6 SC 4 Working Group 6 - Magnetic Disks

Scope: To study and develop specifications for interchangeable magnetic disks, related to:

1) Physical characteristics necessary for mechanical interchange of the medium
2) Magnetic characteristics necessary for interchange of recorded bits
3) Minimum format characteristics necessary for the interchange of information recorded on magnetic disks; these to be established in cooperation with ISO/TC 97/SC2 and SC 5, as the implementation of ISO codes and data organization are in the domain of those subcommittees

Secr: Germany (DNA)

(P) Member Bodies: France, Germany, Italy,Japan, Netherlands, Sweden, Switzerland, UK, USA, USSR

(O) Member Bodies: Brazil, Czechoslovakia

Liaison: ECMA; ISO/TC97/SC2; ISO/TC97/SC4/WG1 and WG/5; ISO/TC97/SC 5

2.5 SC 5 Programming Languages

Scope: The standardization and specification of common programming languages and the characteristics of other software of broad utility, with provision for revision, expansion and strengthening and for the definition and approval of test problems.

Secr: USA (ANSI)

(P) Member Bodies: Denmark, France, Germany, Italy, Japan, Netherlands, Romania, Spain, Sweden, Switzerland, UK, USA

(O) Member Bodies: Australia, Austria, Belgium, Bulgaria, Canada, Czechoslovakia, Hungary, India, Israel, Norway, Poland, Portugal, Republic of South Africa, USSR

Liaison: European Computer Manufacturers Association (ECMA); International Federation for Information Processing (IFIP); Union Internationale des Chemins de Fer (UIC); World Health Organization (WHO)

2.5.1 SC 5 Working Group 1 - Programming Languages for Numerical Control of Machines

Scope: Standardization of programming languages used for numerical control of machines.

Secr: USA (ANSI)

(P) Member Bodies: Denmark, France, Germany, Italy, Japan, Netherlands, Romania, Spain, Sweden, Switzerland, UK, USA

(O) Member Bodies: Australia, Austria, Belgium, Canada, Czechoslovakia, Hungary, India, Israel, Norway, Poland, Portugal, Republic of South Africa, USSR

Liaison: European Computer Manufacturers Association (ECMA); International Federation for Information Processing (IFIP); Union Internationale des Chemins de Fer (UIC); World Health Organization (WHO); ISO/TC97/SC 8, Numerical Control of Machines

2.6 SC 6 - Digital Data Transmission

Scope: To determine and define the system parameters governing the operational action and reaction between communication systems and digital data generating and receiving systems.

Secr: USA (ANSI)

(P) Member Bodies: Denmark, France, Germany, Italy, Japan, Netherlands, Romania, Spain Sweden, Switzerland, UK, USA, USSR

(O) Member Bodies: Australia, Austria, Belgium, Bulgaria, Canada, Greece, Hungary, Israel, Poland, Portugal

Liaison: European Computer Manufacturers Association (ECMA); International Electrotechnical Commission (IEC); International Federation for Information Processing (IFIP); International Telegraph and Telephone Consultative Committee (CCITT); Union Internationale des Chemins de fer (UIC)

2.7 SC 7 - Problem Definition and Analysis

Scope: To establish appropriate standards on definition and analysis of information processing problems in order to define the means, the format, the context and other techniques which will provide a representation of these problems.

Secr: Germany (DNA)

(P) Member Bodies: Denmark, France, Germany, Italy, Japan, Netherlands, Romania, Spain, Sweden, Switzerland, UK, USA

(O) Member Bodies: Australia, Austria, Belgium, Canada, Greece, Hungary, Portugal Republic of South Africa

Liaison: European Computers Manufacturers Association (ECMA); Universal Postal Union (UPU); Union Internationale des Chemins de Fer (UIC); IEC/TC 3/WG 2 ; World Health Organization (WHO)

2.8 SC 8 - Numerical Control of Machines

Scope: Any standardization problem concerning the numerical control of machines; this definition includes, among others, machine-tools, assembling machines, welding and torch-cutting machines, winding machines, drafting machines, inspection and sorting machines.

Secr: France (AFNOR)

(P) Member Bodies: Austria, Denmark, France, Germany, Italy, Japan, Netherlands, Poland, Republic of South Africa, Romania, Sweden, Switzerland, UK, USA

(O) Member Bodies: Australia, Belgium, Canada, Chile, Czechoslovakia, Greece, Hungary, Israel, Norway, Portugal

Liaison: European Computer Manufacturers Association (ECMA); ISO/TC 10, Drawings; ISO/TC 39, Machine-Tools; ISO/TC 97/SC 1, Vocabulary; ISO/TC 97/SC 2, Character Sets and Coding; ISO/TC 97/SC 4, Input/Output; ISO/TC 97/SC 5, Programming Languages; IEC/TC 44, Electrical Equipment of Machine Tools, IEC/TC 67, Analogue Computing Equipment; ISO/TC 97/SC 4/WG 3, Punched Tape; ISO/TC 97/SC 4/WG 1, Magnetic Tape

2.8.1 SC 8 Working Group 1 - Vocabulary

Scope: To verify that the general terms defined by ISO/TC 97/SC 1, Vocabulary, are applicable to the scope of numerical control. To add particular or specific terms to the same scope. To verify that certain specific terms of various scopes have the same meanings in their own fields as they do in the field of numerical control of machines.

Secr: France (AFNOR)

(P) Member Bodies: Austria, Denmark, France, Germany, Italy, Japan, Netherlands, Poland, Romania, Sweden, Switzerland, UK, USA

(O) Member Bodies: Australia, Belgium, Canada, Chile, Czechoslovakia, Greece, Hungary, Israel, Norway, Portugal, Republic of South Africa

Liaison: European Computer Manufacturers Association (ECMA); ISO/TC 10, Drawings; ISO/TC 39, Machine-Tools; ISO/TC97/SC 1, Vocabulary; ISO/TC97/SC 2, Character Sets and Coding; ISO/TC97/SC 4, Input/Output; ISO/TC97/SC 5, Programming Languages; IEC/TC 44, Electrical Equipment of Machine Tools, IEC/TC 67, Analogue Computing Equipment

2.9 **Working Group K, Representations of Data Elements**

Scope: The standardization of the representation of commonly interchanged data elements to facilitate information interchange and information processing.

Secr: USA (ANSI)

(P) Member Bodies: France, Germany, Italy, Japan, Switzerland, UK, USA

(O) Member Bodies: Australia, Canada

Liaison: ISO/TC 12, ISO/TC 95, ISO/TC 46, ISO/TC 46/WG 2; ISO/TC 46/WG 4; International Atomic Energy Agency

3. Activity during 1970

3.1 Meetings held during 1970

TC 97--------------------------------- June 8-11 Berlin
SC 1---------------------------------- June 1-5 Berlin
SC 1/WG 1----------------------------- None
SC 2---------------------------------- October 12-16 London
SC 3---------------------------------- None
SC 3/WG 1----------------------------- None
SC 3/WG 2----------------------------- None
SC 4---------------------------------- February 23-24 Paris
SC 4/WG 1----------------------------- November 16-20 Paris
SC 4/WG 2----------------------------- February 17-18 Paris
SC 4/WG 3----------------------------- February 19-20 Paris
SC 4/WG 4----------------------------- September 28-30 Turin
SC 4/WG 5----------------------------- November 23-26 Paris
SC 4/WG 6-----------------------------September 23-25 Turin
SC 5---------------------------------- None
SC 5/WG 1----------------------------- September 15-18 Berlin
SC 6---------------------------------- June 1-5 Paris
SC 7---------------------------------- June 12 Berlin
SC 8---------------------------------- October 28-30 Berlin
SC 8/WG 1----------------------------- October 27 Berlin
WG K---------------------------------- None

3.2 **Meetings to be Held in 1971**

TC 97-------------------------------- None
SC 1--------------------------------- April 19-23 Paris
SC 1/WG 1---------------------------- None
SC 2--------------------------------- Fall, Tokyo (Tentative)
SC 3--------------------------------- None
SC 3/WG 1---------------------------- February 15-18 Geneva
SC 3/WG 2---------------------------- None
SC 4--------------------------------- Fall
SC 4/WG 1---------------------------- September 20-24 Italy
SC 4/WG 2---------------------------- None
SC 4/WG 3---------------------------- None
SC 4/WG 4---------------------------- Fall
SC 4/WG 5---------------------------- September 27-30 Italy
SC 4/WG 6---------------------------- Fall
SC 5--------------------------------- None
SC 5/WG 1---------------------------- October
SC 6--------------------------------- May 24-28 Netherlands
SC 7--------------------------------- None
SC 8--------------------------------- Fall
SC 8/WG 1---------------------------- Fall
WG K--------------------------------- March 1-5 Paris

4. **Current Program of Work**

4.1 **Itemized list**: 1a through 9

4.2 **Items completed during 1970**:

2f, 4f, 4h, 6c, 6d

4.3 **Items postponed or deleted from program of work**:

None

4.4 **Items to be undertaken in 1971**:

See pages 27-29

4.5 **New or proposed projects** See pages 27-29

4.6 **Problem areas**

None

4.7 **Remarks**

None

TABLE I

ITEM NO.	REF. NOS. OF DOCUMENTS	ITEM	STUDIED BY	STUDIED SINCE	DEVELOPMENT STAGE		REMARKS
					1 JAN.	31 DEC.	
1a	DR 2382	Section 01: Fundamental terms	SC 1	March 1967	C	D	
1b	DR 2383	Section 04: Organization of data	SC 1	March 1967	C	D	
1c	97 N. 411 DR 2455	Section 05: Representation of data	SC 1	August 1967	C	D	
1d	97 N. 415 DR 2452	Section 06: Preparation and handling of data	SC 1	Sept. 1967	C	D	
1e	97/1 N 165	Section 10 Preparation and Formalization of programs	SC 1	Jan. 1968	B	B	Draft Proposal under balloting of SC 1 Members
1g	97/1 N 164	Section 07: Arithmetic logic operations	SC 1	Nov. 1968	B	B	Draft Proposal under balloting of SC1 Members
1h	97/1 N. 188	Section 09: Information Theory	SC 1	1968	A	A	

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					1 JAN.	31 DEC.	
1i	97/1 N. 163	Section 02: Mathematics & Logic	SC1	Nov. 1968	B	B	Draft Proposal under balloting of SC1 Members
1j	97/1 N. 166	Section 11: Programming Techniques	SC1	Nov. 1968	B	B	Draft Proposal under balloting of SC1 Members
1k	97/1 N. 196	Section 12: Instructions	SC1	1969	A	B	Draft Proposal under balloting of SC1 Members
1l	97/1 N. 193	Section 03: Engineering Technology	SC1	1970	-	A	
1m	97/1 N. 189	Section 16: Control Devices, Input and Output Equipment	SC1	1970	-	B	
1n	97/1 N. 209	Section M (13) Operating Techniques and Facilities	SC1			A	
1o	97/1 N. 198	Section R(18) Storage Techniques	SC1			A	
1p	97/1 N. 192	Section 17: Component Units of Arithmetical Equipment	SC1	March 1970		A	

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					1 JAN.	31 DEC.	
1q	97/1 N. 193	Section C (03) Engineering Technology	SC1		A	A	
1r	97/1 N. 176	Section 25 Miscellaneous Applications of Data Processing Operations Research	SC1		A	A	
2a	DR 1418	Representation of 6 and 7-bit coded character sets on punched tape	SC2	1964	G	G	ISO/R1113
2b	DR 1320	Implementation of the 6 and 7-bit coded character sets on 7-track magnetic tape	SC2	1964	G	G	ISO/R 961
2c	DR 1321	Implementation of the 7-bit coded character set on 9-track magnetic tape	SC2	1964	G	G	ISO/R 962
2d	DR 1322	Guide for the definition of 4-bit character sets derived from the 7-bit coded character set	SC2	1966	G	G	ISO/R 963
2e	DR 1323	Magnetic tape labelling and file structure for information interchange	SC2	1966	G	G	ISO/R 1001
2f	DR 1679	Representation of ISO 7-bit coded character sets on 12-row punched cards	SC2	1965	F	G	ISO/R 1679

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					1 JAN.	31 DEC.	
2g	DR 2033	Coding of character sets for MICR and OCR	SC2	1966	D	D	
2h	97/2 N. 347 N. 354	Representation of decimal numbers in packed numeric form	SC2	1966	C	B	Further study in 1970
2i	DR 2047	Graphical representation of control characters of 7-bit coded character set	SC2	1967	C	D	
2j	DR 2021	Representation of 8-bit patterns on 12-row punched cards	SC2	1968	D	D	
2k	DR 2022	Code extension procedures for the ISO-7-bit coded character set	SC2	1967	D	D	
21	97/2 N. 473	Code expansion and a proposed structure for a family of 8-bit codes	SC2	1968	A	A	
2m	97/2 N. 322	Coding of interchange discs media	SC2	1968	A	A	
2n	97/2 N. 323	Coding of edge punched cards	SC2	1968	A	A	

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					1 JAN.	31 DEC.	
2o	97/2 N. 352	Header Labels	SC2	1968	A	A	
2p		See Item 2h					
2q	97/2 N. 310 273	Recording of binary data	SC2	1966	A	A	
2r	97/2 N. 400	Classes of 3-character escape sequences	SC2	1969	C	C	
2s	DR 2375	Procedure for the Registration of Escape Sequence in Data Processing	SC2	1969	B	C	
2t	97/2 N. 471	Revision of ISO/R 646	SC2	1970		A	
2u	97/2 N. 463	Code Extension Procedures for 7 and 8 Bit Codes	SC2	1970		A	
3s	DR 893	Print specifications for magnetic ink character recognition	SC3	1961	G	G	ISO/R 1004

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TABLE I

ITEM NO.	REF. NOS. OF DOCUMENTS	ITEM	STUDIED BY	STUDIED SINCE	DEVEOPMENT STAGE		REMARKS
					1 JAN.	31 DEC.	
3b	DR 996	Alphanumeric character sets for optical character recognition	SC3	1961	G	G	ISO/R 1073
3c	DR 1831	Printing specifications for OCR	SC3/WG1	1962	D	E	
4a	DR 1864	Unrecorded Magnetic Tape for Data Interchange 200-800 RPI (8-32 RPmm), NRZI and 1600 RPI (63 RPmm), phase encoded	SC4	1965	D	E	
4b	DR 1861	7-track 200 RPI (8 RPmm) Magnetic Tape for Data Interchange	SC4/WG1	1965	D	E	
4c	DR 1862	9-track 200 RPI (8 RPmm) Magnetic Tape for Data Interchange	SC4/WG1	1965	D	E	
4d	DR 1863	9-track 800 RPI (32 RPmm) Magnetic Tape for Data Interchange	SC4/WG1	1965	D	E	
4e	97/4/1 N. 233	Recorded Magnetic Tape for Information Interchange 9-track 1600 RPI (63 RPmm), phase encoded	SC4/WG1	1966	B	B	
4f	DR 1681	Specifications for unpunched paper cards	SC4/WG2	1964	F	G	ISO/R 1681

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ITEM NO.	REF. NOS. OF DOCUMENTS	ITEM	STUDIED BY	STUDIED SINCE	DEVEOPMENT STAGE		REMARKS
					1 JAN.	31 DEC.	
4g	DR 1682	Dimensions and location of rectangular punched holes in 80 columns punched paper cards	SC4/WG2	1964	F	D	
4h	DR 1671	Dimensions for Punched Paper Tape for Data Interchange	SC4/WG3	1964	F	G	ISO/R 1154
4i	DR 1729	Properties of Unpunched Paper Tape	SC4/WG3	1964	D	F	
4j	DR 2195	General Requirements for Data Interchange on Punched Paper Tape	SC4/WG3	1966	B	D	
4k	97/4/3 N. 164	Reels and Cores for 1 in. (25,4 mm) Perforated Paper Tape for Information Exchange	SC4/WG3	1966	B	B	
4l	97/4/4 N. 13	System Philosophy Factors	SC4/WG4	1967	A		withdrawn
4m	97/4/4 N. 14	I/O Interface for Data Collecting Systems	SC4/WG4	1968	A		withdrawn
4n	97/4/4 N. 28	Channel Interface	SC4/WG4	1969	A	A	

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					1 JAN.	31 DEC.	
4o	97/4/4 N. 66	Functional Requirement for Channel Level Interface	SC4/WG4	1970	A	A	
4p	DR 1858	General Purpose Hubs and Reels for Magnetic Tape Used in Interchange Instrumentation Applications	SC4/WG5	1967	D	E	
4q	DR 1859	Unrecorded Magnetic Tapes (general dimensional requirements) for Instrumentation Applications	SC4/WG5	1967	D	E	
4r	DR 1860	Precision Reels for Magnetic Tape used in Interchange Instrumentation Applications	SC4/WG5	1967	D	E	
4s	97/4/2 N. 82	Vocabulary	SC4/WG2	1969	A	A	Sent TC 97/ SC1 for consideration
4t	97/4/2 N. 74	Spec. purpose cards	SC4/WG2	1968	A	A	
4u	97/4 N. 144	Magnetic Six-Disc Packs, physical characteristics for mechanical interchange	SC4/WG6	1969	A	B	
4v	97/4 N. 146	Unrecorded Magnetic Tape (Physical Properties) For Information Interchange	SC4/WG5	1970	A	B	

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					1 JAN.	31 DEC.	
4w	97/4 N. 145	Magnetic Six-Disk Packs, Physical Characteristics for Magnetic Interchange	SC4/WG6	1970	A	B	
4x	DR 2195	General Characterisitcs for Information Interchange on Wound Punched Paper Tape	SC4/WG3		A	B	
4y		First Revision to DR 1861	SC4/WG1	1970	B	C	
4z		First Revision to DR 1862	SC4/WG1	1970	A	B	
4aa		First Revision to DR 1863	SC4/WG1	1970	A	B	
4bb		First Revision to DR 1864	SC4/WG1	1970	A	B	
4cc	97/4/5 N. 87	Recorded Magnetic Tapes (Standard Tape and 7 Track Configuration)	SC4/WG5	1970	A	A	
4dd	97/4/5 N. 86	General Purpose Reels with 8mm (5/16 in) Centrehole for Magnetic Tape	SC4/WG5	1970	A	A	

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					1 JAN.	31 DEC.	
4ee	97/4/1 N. 301	Magnetic Tape Cassettes	SC4/WG1	1970	A	B	
4ff	97/4/6 N. 50	Format for Six-Disk Packs	SC4/WG6	1970	-	A	
5a	DR 1538	ALGOL	SC5	1962	D	F	
5b	DR 1539	FORTRAN	SC5	1962	D	F	
5c	DR 1672	Hardware Representation for ALGOL in the ISO 6 and 7-Bit Character Sets	SC5	1967	D	D	Referred back to ISO/TC97/SC5
5d	DR 1989	COBOL	SC5	1965	D	D	
5e	97/5 N. 221	Criteria to be applied in the standardization of a Programming Language	SC5	1965	C	C	
5f	-	Programming Language used for Numerical Control of Machines (APT-like Reference Language)	SC5/WG1	1967	D	D	Processor Output only

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					1 JAN.	31 DEC.	
6a	DR 1745	Basic Mode Control Procedures	SC6	1961	E	E	
6b	97/6 N. 330	Revision and extensions to basic Mode Control Procedures	SC6	1967	B	B	
6c	DR 1732	Use of Longitudinal Parity to detect errors in Information Messages	SC6	1961	G	G	ISO/R 1155
6d	DR 1734	Character Structure for start/stop and synchronous transmission	SC6	1961	F	G	ISO/R 1177
6e	DR 2110 DR 1733 97/6 N. 315	Assignment of Connector Pin Numbers for interchange circuits between data terminal equipment and data communication equipment where CCITT Recommendation V 24 applies	SC6	1967	C	D	*ISO assigned DR2110 and cancelled Number DR1733
6f	97/6 N. 328	Code Transparent Transmission Control Procedures	SC6	1966	C	C	
6g	97/6 N. 325 N. 329	One-way and two-way Transmission Control	SC6	1968	A	A	
6h	97/6 N. 248 N.224, 326	Synchronization	SC6	1968	A	A	

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					1 JAN.	31 DEC.	
6i	97/6 N. 157	System Performance	SC6	1961	A	A	
6j	97/6 N. 332	Signaling Quality	SC6	-	A	A	
6k		Data Signaling Rates	SC6	-	A	A	
6l		Glossary	SC6	1961	A	A	
6m		Return Channels	SC6	1967	A	A	
6n	97/6 N. 225 N. 313 N. 292	Acoustic Coupling	SC6	1967	A	A	
7a	DR 1299	Flow Chart Symbols	SC7	1963	G	G	ISO/R 1028
7b	97/7 N. 56 N. 63	Flow Chart Conventions	SC7	1965	B	B	

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7c	97/7 N. 68 N. 71	Use of Flowchart Symbols	SC7	1970		A	
8a	DR 1314	Code for the Numerical Control of Machines	SC8	1964	G	G	ISO/R 840
8b	DR 1315	Axis and Motion Nomenclature for Numerically Controlled Machines	SC8	1964	G	G	ISO/R 841
8c	DR 1316	Punched tape block formats for the numerical control of machines. Coding of preparatory functions G and miscellaneous Functions M.	SC8	1966	G	G	ISO/R 1056
8d	DR 1317	Interchangeable punched tape variable block format for positioning and straight-cut numerically controlled machines.	SC8	1966	G	G	ISO/R 1057
8e	DR 1318	Punched tape variable block format for positioning and straight-cut numerically controlled machines.	SC8	1966	G	G	ISO/R 1058
8f	DR 1319	Punched tape fixed block format for positioning and straight-cut numerically controlled machines.	SC8	1966	G	G	ISO/R 1059
8g	97/8 N. 150	Punched tape variable block format for contouring and positioning numerically controlled machines	SC8	1967	B	B	

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					1 JAN.	31 DEC.	
8h	97/8/1 N. 154	General Terms Programming	SC8/WG1	1967	B	C	Transmitted to SC1
8i	97/8/1 N. 19	Terms on errors, accuracy, ...	SC8/WG1	1968	A	A	
8j	97/8/1 N. 33	Chapters 3 to 6	SC8/WG1	1967	A	A	
8k	97/8 N. 133	Sensor (or Transducer) Nomenclature	SC8	1969		A	
8l	97/8 N. 151	Symbols for the numerical control of machines	SC8	1969	A	B	
8m	97/8 N. 185	Formats for Contouring	SC8	1970	B	B	
9	97 N. 314	Abbreviations for Names of Units in the International System (SI)	WGK	1968	B	B	

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DRAFT ISO RECOMMENDATIONS
PREPARED BY ISO/TC97

DR NO.	TITLE
DR 1538	Programming Language ALGOL
DR 1539	Programming Language FORTRAN
DR 1672.2	Hardware Representation of ALGOL Basic Symbols in the ISO 6 and 7 Bit Coded Character Sets
DR 1682	Dimensions and Location of Rectangular Punched Holes in 80 Column Punched Ppaer Cards
DR 1729	Properties of Unpunched Paper Tape
DR 1733	Now DR 2110
DR 1745	Basic Mode Control Procedures for Data Communication Systems
DR 1831	Printing Specifications for OCR
DR 1858	General Purpose Hubs and Reels with 76mm (3 in.) Centrehole For Magnetic Tape Used In Interchange Instrumentation Applications
DR 1859	Unrecorded Magnetic Tape (General Dimensional Requirements) for Instrumentation Applications
DR 1860	Precision Reels for Magnetic Tape Used in Interchange Instrumentation Applications
DR 1861	7 Track 8 RPmm (200 RPI) Magnetic Tape for Information Interchange
DR 1862	9 Track 8 RPmm (200 RPI) Magnetic Tape for Information Interchange
DR 1863	9 Track 32 RPmm (800 RPI) Magnetic Tape for Information Interchange
DR 1864	Unrecorded Magnetic Tape for Information Interchange- 8 and 32 RPmm (200 and 800 RPI), NRZI, and 63 RPmm (1600 RPI), phase encoded
DR 1989	Programming Language COBOL
DR 2021	Representation of ISO 8 Bit Coded Character Set on 12-Row Punched Cards
DR 2022	Code Extension Procedures for ISO 7 Bit Code
DR 2033 -	Coding of Character Sets MICR and OCR

DR NO.	TITLE
DR 2047	Graphical Representations for the Control Characters of the ISO 7-Bit Character Set
DR 2110 (Formerly 1733)	Data Terminal and Data Communication Equipment-Interchange Circuits - Assignment of Connector Pin Numbers
DR 2111	Code Independent Transfer Procedure
DR 2195	Data Interchange on Rolled-Up Punched Paper Tape-General Requirements
DR 2375	The Procedure for the Registration of Escape Sequences in Data Processing
DR 2382	Section 01 Vocabulary Fundamental Terms
DR 2383	Section 04 Vocabulary Organization of Data
DR 2452	Section 06 Vocabulary Preparation and Handling of Data
DR 2455	Section 05 Vocabulary Representation of Data

ISO RECOMMENDATIONS
PREPARED BY ISO/TC97

ISO R NO.	TITLE	DATE PUBLISHED	DR NO.
R 646	6 and 7 Bit Coded Character Sets for Information Interchange		1052
R 840	Code for Numerical Control of Machines	1968.10	1314
R 841	Axis and Motion Nomenclature for Numerically Controlled Machines	1968.10	1315
R 961	Implementation of the 6 and 7-Bit Coded Character Sets on 7 Track 12,7mm (1/2 in.) Magnetic Tape	1969.02	1320
R 962	Implementation of the 7-Bit Coded Character Set on 9 Track 12,7mm (1/2 in.) Magnetic Tape	1969.02	1321
R 963	Guide for the Definition of 4-Bit Character Sets Derived from ISO 7-Bit Coded Character Set for Information Processing	1969.02	1322
R 1001	Magnetic Tape Labelling and File Structure for Information Interchange	1969.03	1323
R 1004	Print Specifications for Magnetic Ink Character Recognition	1969.03	893
R 1028	Flowchart Symbols for Information Processing	1969.03	1299
R 1056	Punched Tape Block Formats for the Numerical Control of Machines Coding of Preparatory Functions G and Misc. Functions M	1969.04	1316
R 1057	Interchange Punched Tape Variable Block Format for Positioning and Straight-Cut Numerically Controlled Machines	1969.04	1317
R 1058	Punched Tape Variable Block Format for Positioning and Straight-Cut Numerically Controlled Machines	1969.04	1318
R 1059	Punched Tape Fixed Block Format for Positioning and Straight-Cut Numerically Controlled Machines	1969.04	1319
R 1073	Alphanumeric Character Sets for Optical Recognition	1969.05	996
R 1113	Representation of 6 and 7 Bit Coded Character Sets on Punched Tape	1969.09	1418
R 1154	Dimensions for Punched Paper Tape for Data Interchange	1969.11	1671

ISO R NO.	TITLE	DATE PUBLISHED	DIR NO.
R 1155	The Use of Longitudinal Parity to Detect Errors in Information Messages	1969.11	1732
R 1177	Character Structure for Start/Stop and Synchronous Transmission	1970.01	1734
R 1679	Representation of ISO 7-Bit Coded Character Set on 12-Row Punched Cards	1970.07	1679
R 1681	Specifications for Unpunched Paper Cards	1970.12	1681

These ISO Recommendations were developed by DATCO, assisted by ISO/TC 97

R 2014	Writing of Calendar Dates in all Numeric Form	1971.01	2014
R 2015	Numbering of Weeks	1971.01	2015

	TITLE	MEMBERSHIP																																				
		Australia	Austria	Belgique	Bresil	Canada	Chile	Colombia	Tchecoslovaquie	Denmark		France	Germany	Greece	Hongrie	India	Iran	Ireland	Israel	Italie	Japan	Netherlands	New Zealand	Norway	Pakistan	Pologne	Portugal	Rep. of S. Africa	Roumanie	Spain	Suisse	Sweden	Turquie	United Kingdom	USA	USSR	Yougoslavie	Bulgaria
97	Technical Committee	P	O	O	P	P	O	O	P	P		P	P	O	O	O	O	O	O	P	P	P	O	O	O	P	O	O	P	P	P	P	O	P	P	P	O	O
1	Vocabulary	O	O	O		O			O	P		P	P		O				O	P	P	P		O		P	O		P	P		P		P	P			
1/1	Vocabulary Maintenance											P	P																						P			
2	Character Sets & Coding	O	O	O		O				O		P	P		O				O	P	P	P		O		O	O	P	P	P	P	P		P	P			
3	Character Recognition	O	O	O		O				O		P	P		O				O	P	P	P		O		O	O			P	P	P		P	P	P		O
3/1	Optical Character Recognition	O										P	P							P	P	P									P	P		P	P	P		
3/2	Mag. Ink Character Recog.	O		P								P	P							P		P									P			P	P			
4	Input-Output	O		O		O			O	O		P	P		O				O	P	P	O		O		O	O			P	P	P		P	P	P		
4/1	Magnetic Tape	O		O					P			P	P							P	P	P				P				O	P			P	P	P		
4/2	Punched Cards	O		O					P			P	P							P	P	O				P				O	O	O		P	P	P		
4/3	Punched Tape	O		O		O			P			P	P							P	P					P				O	P			P	P	P		
4/4	Input-Output Equipment	O		O					P			P	P							P	P									O		P		P	P			
4/5	Instrumentation Tapes			P					O			P	P							P	P													P	P	P		
4/6	Magnetic Disc Packs				O							P	P							P	P	P									P	P		P	P	P		
5	Programming Languages	O	O	O		O			O	P		P	P		O	O			O	P	P	P		O		O	O	O	P	P	P	P		P	P	O		O
5/1	P L for Num. Con. of Mach.	O	O	O		O			O	P		P	P		O	O			O	P	P	P		O		O	O	O	P	P	P	P		P	P	O		
6	Digital Data Transmission	O	O	O		O				P		P	P	O	O				O	P	P	P				O	O		P	P	P	P		P	P	P		O
7	Problem Definition & Analysis	O	O	O		O				P		P	P	O	O					P	P	P					O	O	P	P	P	P		P	P			
8	Numerical Control of Machines	O	P	O		O	O		O	P		P	P	O	O				O	P	P	P		O		P	O	P	P		P	P		P	P			
8/1	NC Vocabulary	O	P	O		O	O		O	P		P	P	O	O				O	P	P	P		O		P	O	O	P		P	P		P	P			
K	Data Elem.	O				O						P	P							P	P										P			P	P			

Business Equipment Manufacturers Association 1828 L Street NW Washington DC 20036 202 466 2288

bema

November 13, 1970

Mr. Donald E. Sowle
Director of Commission Studies
Commission on Government Procurement
1717 H Street, N. W.
Washington, D. C. 20006

Dear Mr. Sowle:

Enclosed are 15 copies of the initial statement of the Data Processing Group of the Business Equipment Manufacturers Association (BEMA/DPG) to the U. S. Commission on Government Procurement. This statement centers primarily on the procurement of products related to automatic data processing. We wish to advise, however, that more detailed statements on similar equipment may be expected during the course of study.

In the interim, it will be appreciated if any additional questions and comments related to our industry be directed to this office.

Sincerely,

James F. Holmes
Associate Director
Data Processing Group

Enclosures

/pg

Before the

UNITED STATES COMMISSION ON GOVERNMENT PROCUREMENT

In the Matter of

General Review of United States
Procurement, Policies and Practices

COMMENTS OF

BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION
DATA PROCESSING GROUP

INTRODUCTION

The Business Equipment Manufacturers Association (BEMA) is a trade association which has represented the business equipment industry for over fifty years. It is also the approved sponsor under the American National Standards Institute (ANSI) (formerly the American Standards Association and USA Standards Institute) for the establishment of domestic and international standards related to information processing, computers and office machines.

BEMA is organized with three semi-autonomous product area groups:

- Data Processing Group (DPG)
- Office Machines Group (OMG)
- Office Furniture and Equipment Group (OFEG)

The BEMA members join groups according to the specific interest of the company. As a result, companies with diverse interests may have membership in more than one group. The BEMA/DPG member companies are as follows:

DATA PROCESSING GROUP

Addressograph Multigraph Corporation

Ampex Corporation
    Videofile Information Systems Division

Burroughs Corporation

Computer Machinery Corporation

Control Data Corporation

DATA PROCESSING GROUP (Cont'd.)

Data Products Corporation

Data Recall Corporation

Digitronics Corporation

General Electric Company
    Information Systems Group

GT & E Information Systems, Inc.

Honeywell Information Systems, Inc.

IBM Corporation

Litton Industries, Inc.
    Automated Business Systems Division

Moore Business Forms, Inc.

Mosler

The National Cash Register Company

Olivetti Corporation of America

Pitney-Bowes, Inc.

RCA Corporation
    Information Systems Group

The Singer Company

Sperry Rand Corporation
    UNIVAC Division

The Standard Register Company

Stromberg DatagraphiX, Inc.

Tally Corporation

UARCO, Inc.

Viatron Computer Systems Corporation

Wang Laboratories, Inc.

Xerox Corporation

These companies have been in the forefront of major developments in concept and application that have brought the office equipment and data processing fields to their present significant status in both Government and industry. In addition, they are engaged in diverse activities in those fields such as applied research and systems development; engineering, manufacturing, financing, sale and use of computers, office and related equipment; the operation of data processing service centers; various types of support and maintenance for users of their equipment; the manufacture and sale of supplies required by such users; and the provision of specialized services.*

BEMA is concerned with all factors that affect the activities of the industry, and hence several of its committees observed with interest the shaping and enactment of Public Law 91-129, establishing the Commission on Government Procurement. On June 22, 1970 the Association convened an ad hoc Committee for Response to the Commission on Government Procurement. This Committee, through working group meetings, staff reviews and Counsel assistance, developed this statement for submission to the Commission.

As a result of the process of development described above, the content of this statement, which is directed primarily toward procurement of major data processing systems, has been reviewed with care within BEMA/DPG and its member companies; it is submitted as a general consensus of the member companies who have participated in its preparation. BEMA/DPG is submitting this statement during the formative phase of the Commission's work to raise substantive issues for consideration. Additional statements regarding the procurement of other business equipment, as well as more specific statements relating to the procurement of complex data processing systems are anticipated. BEMA is also aware that several of its member companies intend to submit ancillary statements detailing issues of particular concern to them. As the work of the Commission progresses, new issues may be raised or further information may be required. BEMA will then convene appropriate groups to develop additional statements for submission.

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*At the present time Federal Government direct annual expenditures for purchase and rental of equipment and for services from BEMA member companies exceeds $700 million. This total, and others herein, was derived from figures contained in the current GSA Invitations to Bid.

GENERAL DISCUSSION OF PROBLEM AREA

BEMA is in agreement with the testimony before the House Committee on Government Operations and House Report 91-468 that the time for thorough review of the procurement function is overdue. The situation facing BEMA/DPG member companies, however, has been altered considerably by the enactment of Public Law 89-306 (the Brooks Bill), the provisions of which treat the procurement and utilization of automatic data processing (ADP) equipment. The comments herein are thus conditioned on the existence of the Armed Services Procurement Act, the Federal Property and Administrative Services Act and the Brooks Bill.

The Brooks Bill was the first legislative recognition by the Federal Government of the necessity to improve the procurement of ADP equipment. The Public Law was enacted in recognition of the continuing pace of technological change and the development of the systems concept. The fact of technological change is well documented; however, the current idea of the term "systems concept" is sufficiently complex so as to warrant definition. A systems concept entails a rigorous review of objectives, resources (human, economic, hardware) and requirements to deduce the most effective design for fulfilling a particular function. Having done this design, the parameters for the necessary managerial, personnel, hardware and software resources are delineated. Dependent upon the complexity of the particular function, a number of design and delineation steps may be required to achieve the most effective system. It is only after the most effective system design has been achieved that the actual process of procurement is initiated.

An example of how the systems concept has changed can be illustrated by considering that records management once required only the procurement of paper and filing cabinets. Then microfilm came into use. Now the choices range from paper and microfilm to microfische. It appears quite possible that in the future laser controlled devices will be a choice. At the time when paper was the storage medium, the systems concept function was a question of clerical office management. Now large parts of the system related to clerical office management are engineered into the equipment offered, requiring a preprocurement analysis of how the purchaser wishes to design the function and then deriving functional specifications for complex equipment by which these many tasks can be performed. These complex systems are termed "management control systems."

Clearly, the complex nature of new management control systems (including systems design in face of advancing technology and shortening response time in an effort to meet and anticipate needs of a more rapidly changing and demanding society) sets apart ADP equipment and similar complex equipment from other routine procurement. Given these complex requirements, a prime prerequisite of Government procurement planning should include the ability to respond efficiently and effectively to change and innovation. Apparently, there has been a recognition of the difference of ADP and related equipment procurement because highly qualified, professional procurement teams have been established in some agencies. However, they do not appear to have the basic framework nor appropriate review procedures which are necessary in the exercise of their operational and innovative capabilities.

The basic statutes cited above, plus the Federal Property Management Regulations (FPMR) and Armed Service Procurement Regulations (ASPR) create a complex network of detailed, technical requirements, restricting severely the Government's ability to react through the procurement process to the changes demanded by society, technology and business conditions. The creation of this complex network of detailed, technical requirements tends to obscure the major objective of providing a basic framework with appropriate review procedures within which to operate and innovate. In order to understand clearly the situation currently facing all concerned with the procurement process, it is recommended that the Commission study the content and size of the FPMR and ASPR and the volume of changes thereto. It is our position that, except for instances which are clearly differentiable, the general regulations for the procurement process of ADP equipment should be the same regardless of the procuring agency. It is wasteful of both the Government's and industry's efforts to maintain parallel sets of regulations. In addition to minimizing the sources of regulation, attention should be given to increasing the ability of industry to comment on and locate relevant regulations in the FPMR. At a minimum, it is recommended that the procedures of notice, consultation, review and codification implemented for the ASPR be extended to the FPMR. As a further step, there should be established a formal procedure for rationalization of the differences between ASPR and FPMR for ADP equipment procurement.

An objective that is always important is to facilitate the procurement process for the smaller vendor. Recent history has proven again that the man with a good idea can make a success in American industry, especially in periods of great technological change. The Government marketplace represents an increasingly large portion of the total market. However, to the small businessman it is a particularly difficult one.

In summary, the progress which has been made to date in the procurement function both in GSA and the user agencies is applauded. The need for more of the highly qualified personnel who have broken new ground, particularly in the ADP equipment area is noted. Finally, the need for a conceptual framework for Federal Government procurement within which the process of ADP equipment and complex systems procurement can evolve to meet social and technological change is stressed.

1. EVALUATION AND SELECTION

Advancing technology has increased the cost and complexity, for both vendor and buyer, of matching the Federal Government's ADP and other complex equipment needs with the appropriate equipment and software.* Most large Government agencies have established groups to evaluate and select specifically the best match of proposed resources for agency wide use. These centralized groups have achieved objectivity in selection and economies in use of equipment resources. However, we feel we are at a point in time when even more can be achieved in these areas.

With any rapidly growing industry, such as exemplified by the business equipment industry, innovation is required in all aspects of development, selection, procurement and use if the most user advantage is to be realized from the industry. The Government has been innovative in the past in ADP equipment procurement, and it is through this innovation that the Government has led the way in the effective use of this equipment.

The U. S. Commission on Government Procurement provides a unique opportunity for a review on the part of Government as the user, and industry as the supplier, of the innovations that have occured in ADP and other complex equipment evaluation and selection, in order to gain additional economies. The fundamental objective of procuring the best equipment and services at the least cost can be met better by conformance within three specific areas of concern, as follows:

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*Report of the Conference on the Management of Computer Systems in the Federal Government, sponsored by the Office of Management and Budget, July 20-22, 1970. (Hereinafter Myrtle Beach Conference), p. 4.

- Clear and open criteria
- Minimizing the cost of bidding
- Centralized selection and procurement for ADP equipment

Each of these suggestions is discussed in more detail in the following paragraphs.

1.1 Clear and Open Criteria

The mandatory specifications of a request for proposals nearly always allow some latitude to the bidder. In addition, the objective is not necessarily to obtain the lowest bid system but rather the best system at the least cost. As described in Comptroller General Decision B-167492, various point or other quantitative evaluation schemes have been developed to aid the procurement team. There are four particular areas for improvement, enumerated below:

(1) Evaluation Criteria

The evaluation criteria to be employed in a selection should be disclosed openly and clearly at the time bids are solicited. The value of this recommendation is that it not only forces a relative priority ranking of what is of real importance in an evaluation, but it also allows the bidder to match better the needs of the job at the least cost. Although it may be contended that such an approach allows the bidder to "sharpshoot" the solicitation, mature consideration will show that this is exactly the intent of the procurement function; i.e., to provide the closest match between the buyers' needs and the vendors' products.

Procedures to implement dissemination of evaluation criteria are under consideration for both the FPMR and ASPR. While industry is heartened by the consideration of such changes, it feels that the constantly increasing level of competition for the Government market would be made more orderly and equitable by the adoption of open criteria rules.*

(2) Weighting Requirements

Requirement specifications are often stated under two captions:

- Mandatory requirements -- Those specifications which must be met to produce a qualified bid and usually those to which a value is clearly attachable; and
- Desirable features -- Those specifications which will be included in the evaluation but which do not affect the qualification of the bid.

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*It is our understanding that the language proposed currently to meet these needs is: "In order to enable offerers to prepare a proposal or quotation properly, the solicitation shall identify all the evaluation factors which are to be considered including desirable features where applicable and the related weights exposed in dollar value or points which are to be assigned to each desirable feature." (Revision to 101 FPMR 32.408-5)

While mandatory requirements are understood generally, each desirable feature has a value to the Government, but its dollar value is not stated often. If the value of the desirable feature to the Government would be specified, the bidders could determine whether their cost of development for such features is in line with the Government's appraisal value. This would allow the bidders to apply resources to desirable features which could result in the lowest overall cost proposals to the Government.

The Department of the Air Force utilizes such procedures at this time. It is also understood that consideration of such procedures for inclusion in ASPR and FPMR is in progress.* Since these procedures aid the procuring officers in determining the quantitative value placed on desirable features, as well as aiding the vendors in constructing their bids, it is recommended that they be evaluated for use throughout the procurement system.

(3) Funding Methods

At the time a request for proposals is being distributed to potential bidders, the most likely funding arrangement for the procurement should be stated. If the bidders are aware of the most likely funding arrangement, they can more accurately predict the revenue impact of a potential contract award, and thus can optimize the price to benefit the Government under the most probable funding arrangement. Funding arrangements experienced by BEMA/DPG members are usually:

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*Ibid.

- Outright purchase
- Rent with option to buy
- Rental

The varying internal objectives of vendors result in differing policies towards these three types of funding arrangements. If the most likely means of funding is known, the vendor can consciously decide how to price his bid.

(4) Residual Value

Explicit standards for computation of residual value of equipment should be developed. Such values are needed in the economic analysis of whether the Government should lease or purchase the equipment proposed. Residual value is, however, a matter of wide interpretation by the evaluation and selection groups who may not know the potential for further use of the equipment in other areas of the Government. As a minimum, the residual value formula to be used should be published as a part of the solicitation to bid.*

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*Myrtle Beach Conference, pp. 6, 7.

(5) Functional Specifications

Insofar as possible, the specifications should describe the functions to be performed. In an environment of rapidly changing technology, the most important responsibility of the vendee is to describe the job that is to be accomplished, not to produce a list of specific components.

It can be argued that there are instances which require the procurement of a given number of components of specified description. However, if a vendor can perform the same function within the same environmental parameters but utilizing a different approach, he should be encouraged to do so, in order to compete more effectively since the ultimate result will be a lowering of costs through advanced competition and technology.

Separate procurement of peripherals and procurement of systems in which the Government is the systems integrator are analogous actions in this area. In all of these cases the user is attempting to maximize the efficiency with which he performs his job while minimizing total cost. Removing arbitrary restrictions on the specific equipment, which may be bid in response to a solicitation, operates in the same manner as separate procurement of peripherals by freeing manufacturers with differing approaches from preconceptions which may exist in the user agency.

In summary, industry recognizes that the valuation of specifications and projections of economic value for a system are indeed difficult in the face of technological and governmental mission change; however, if such techniques are to be part of the procurement process, then the function to be performed and the values and methods of computation to be used in evaluation must be made available to permit the vendor to evaluate properly the elements of his bid.

1.2 Minimizing the Cost of Bidding

Three factors have been identified which raise substantially the cost of the procurement process for both industry and Government. As will be shown, these costs are mostly indirect. In the case of Government, the cost of the procurement process is not added explicitly to the systems cost. (It would, however, be a useful tool for evaluating the procurement process to compute the ratios of procurement cost to total systems cost and procurement cost to estimated savings.) Those engaged in selling to the Government must include, in the long run, all such costs in the prices of their products.

(1) Benchmarks and Simulation

Explicit criteria should be established governing development and use of specialized benchmarks, standardized benchmarks and simulation in the selection of ADP equipment systems and components. In essence, such benchmarks and simulations give the selection group a means of assurance that the proposed equipments can accomplish specifically the job to be done. One experiences the widest variation in bidder requirements in these areas by the different evaluation and

and selection groups. The areas of variation include everything from the complete execution of the total production job to the demonstration of equipment characteristics or simulation. The trend appears to be in the direction of more elaborate benchmarks that tend to reduce the number of bidders and increase the cost of bidding and selection.

As an alternative to the current procedures and as an alternative to increasing the use of simulation, it is recommended that the Government require benchmark performance tests from only those bidders under serious consideration for final selection. This would give the Government the lowest priced system to accomplish its mission, would save the other bidders unnecessary expenditures, and would thus allow a much greater participation by the small suppliers. In addition, it would reduce the evaluation and selection time which would allow the Government to proceed with the necessary paper work for prompt installation and use of the equipment.

There is a trend, too, toward a greater dependence on simulation rather than benchmarks.* There are, however, substantial questions which must be addressed before the proper role of simulation in the procurement process can be determined. Some of the questions are:

- Is it possible to develop and maintain a simulator capable of simulating all ADPE?

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*Myrtle Beach Conference, pp. 4, 5.

- To what extent would such a simulator be tested continually against real systems (both new products and procurred systems)?
- What is the total cost to all parties when simulation is used as compared to the total cost of using benchmark tests?
- Who should develop and maintain the simulator; what are the legal rights and remedies of the vendors if a third party performs the simulation?
- In which cases is benchmarking the better approach and in which cases is simulation the better approach?
- Should the vendor have the option of bidding through benchmarks or simulation?

(2) Speed Up Procurement Cycles

There is a need to speed up the process of selection and procurement. In some agencies, for example, even for a relatively simple, single computer system, an average of more than one year elapses from the submission of a proposal to the award of a contract.* Not only does this delay add to the cost of bidding and selecting, but the Government loses the opportunity to take early advantage of new developments in the industry since equipments selected are older by at least the amount of time of selection.

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*Report of the Conference on the Selection and Procurement of Computer Systems by the Federal Government, sponsored by the Bureau of the Budget, September 15-17, 1969, p. 8.

This lengthy cycle also penalizes the smaller vendors. Most small companies are characterized as being "quick on their feet," not encumbered with corporate bureaucracy. A consequence of this is that the small company cannot afford to concentrate heavily for a year or more on a sale which may be no larger than its average commercial sale.

If one of the background objectives is to ease the burden on small business, shortening the procurement cycle is a key step. Minimization of the cost of bidding should be a joint effort on the part of both Government and business. In this regard, the practice of obtaining last minute rebids at lower prices by suppliers can constitute a two-edged sword. While in an individual situation this may appear to provide a lower price on a particular procurement, it also results in further delay for rebids by the competition. When, as is often the case, this is followed by a second or even a third round of rebids, the process can degenerate into no more than a thinly disguised auction, a practice which, if carried out directly, would be forbidden specifically by procurement regulations.* Not only is such auction-type procurement not in the Government's own interests, as exemplified by the regulations, but also it increases the cost of bidding and lengthens the procurement cycle in detriment to all bidders -- large and small -- but particularly, as noted above, to the smaller suppliers.

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*41 CFR 1-3.805-1 (b).

(3) Excessive Documentation

The bidding process may go through many rounds. On each round all of the potential vendors may be required to duplicate their prior documentation. One specific and expensive example of this requirement is shown in the two paragraphs following.

In many cases the Government solicitation for proposals for larger computer procurements requires voluminous pricing detail. This includes not only detailed price schedules on purchase, lease, lease with purchase options, and maintenance but also projections over future years, giving effect to cost of money and related costs of electrical power, air conditioning, site preparation and other detailed processing.

The creation of such a pricing presentation requires extensive man hours of effort by each bidder, and in many cases the use of a computer system which has been programmed to develop the required data. This is very costly to the bidders and since only one of the total population of bidders will finally receive a contract, the time and expense of unsuccessful bidders is wasted. As a solution it is recommended that the Government require only summary pricing data for the first round of proposals. This would be quite adequate for initial evaluation. A single bidder, or at least a small number of bidders, selected tentatively for award could then be asked to develop the complete detailed pricing presentation. It is also recommended that the Government not require bidders to develop complete pricing packages for each iteration in a procurement situation in which succeeding price reductions are negotiated. The benefit to the Government is that bidding costs, which are ultimately supported in part or in whole by the Government, would be reduced and that the Government evaluation teams would be spared the need to analyze superfluous data.

1.3 Centralized Selection and Procurement of ADP Equipment for Smaller Government Agencies

As has been noted, procurement of the products of most BEMA/DPG members is a highly technical and complex process extending over a considerable length of time. The entire procurement process involves systems definition, system design, preparation of specifications, evaluation of proposals, negotiation of contracts, installation and test, and future modification and upgrading of equipment and software. Adding to the complexity of the process is the dynamically advancing technology of the industry and the absence of any clearly defined means of measuring anticipated performance in relationship to costs.

To cope with this situation, the major user agencies in Government have developed highly specialized, central organizations for ADP procurement, which write the specifications, evaluate the proposed systems and make the selection. The principal example is in the Defense Department where each military department has a central group dedicated to the evaluation and selection of ADP. The results have proven highly beneficial to both the Government agencies and the vendors.

Serious consideration should be given to establishing a central evaluation and selection group for procurement of such complex systems in each major user agency that does not currently have one, and a single Government wide group for all other smaller Government users.

Advantages include:

- It brings an objective philosophy to evaluation and selection of complex systems that makes efficiency and economy the guidelines for procurement and fosters fair and open competition.
- A highly qualified staff of professionals is developed and retained full time instead of setting up ad hoc teams periodically to perform the function. This also enables the most efficient utilization of scarce, highly skilled technical personnel and facilitates their keeping abreast of the fast changing state-of-the-art.
- It is more economical for vendors to deal with a central selection group for ADP; this minimizes the number of contracts required and facilitates standardization of specifications and formats.

2. MULTI-YEAR CONTRACTING

At the present time the Federal Government spends more than $344 million each year for the lease of ADP and related equipment. The vast majority of this is by annually renewable rental agreements with a 30-day cancellation clause. In addition, the Federal Government spends in excess of $42 million for annual repair and rehabilitation contracts covering such equipment.

While the Federal Government leases equipment through annual contracts, the average life of equipment of this type in Government service is eight years. It should also be noted, for example, that the system life for ADP equipment is calculated at four to six years for evaluation purposes. Long-term lease and service contract rates are substantially below annual rental and service rates. In addition, more favorable purchase option terms are attainable and are being offered currently to commercial customers.

The Government, however, at the present time appears unable to enter into such long-term contracts.* There appear to be two legal restrictions to the use of multi-year contracts by the Government:

(1) The first restriction relates to the use of fiscal year appropriations. Contracts under fiscal year appropriations must be restricted to the period of availability of the appropriation involved.**

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* Myrtle Beach Conference, pp. 6, 7.

**Comptroller General Decision B-164908, January 31, 1969.

Contracts executed and supported under authority of fiscal year appropriations can only be made within the period of their availability and must concern a bonafide need arising within the fiscal year availability.* Since the majority of Government ADP equipment leases and service contracts are funded from annual appropriations, such contracts are necessarily limited to one year. However, both the General Services Administration and the Defense Department have been exempted from these restrictions.**

(2) The second restriction relates to the availability of funds before the Government enters into a contract. No obligations can be incurred by the Government in excess of available appropriations or in advance of appropriations being made therefore unless authorized by law.*** There are, however, specific exceptions to this requirement. For example, the Defense Department has statutory authority to enter into multi-year service contracts under fiscal year appropriations for work to be performed outside the continental United States.

In general, multi-year contracts are permitted only when:

- the funds to be obligated are no-year funds, and

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* Section 3735, Revised Statutes, 41 U.S.C. 13.

** Ibid.

***Anti-Deficiency Act, Section 3679, R.S. 31 U.S.C. 665(a).

- the funds are obligated for the full contractual liability of the Government.

This can be in the form of funding annual increments plus maximum cancellation costs. However, the majority of BEMA/DPG members' procurements are funded from annual appropriations.

The decision is clearly one for the Government to make. Annual appropriations provide, at least theoretically, greater control over programs. On the other hand, multi-year contracting provides clear dollar savings, principally to the Government in total lease costs, but also by reducing the administrative overhead for both parties.

The GSA Revolving Fund represents an attempt at circumventing these restrictions for ADP equipment; however, the theoretical potential of this concept has not been reached due to insufficient funding.*

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*Myrtle Beach Conference, p. 7.

3. GSA/INDUSTRY RELATIONS

It is not industry's intent to enumerate the everyday problems regarding contract negotiation. We do wish to make clear our admiration for and support of the efforts of GSA personnel. The Brooks Bill centralized ADP equipment procurement in the GSA only five years ago. Considering the volume and nature of this activity, GSA is to be commended highly on its performance. However, there is currently a problem of great concern to the ADP industry with regard to the negotiation of annual Federal Supply Schedule (FSS) contracts.

While these FSS contracts cover a fiscal year period, negotiations are frequently not concluded by the start of the fiscal year, with numerous instances of delays of several months. During this period of time, no FSS contract is in force and no payments are made to the equipment suppliers until the new one is in force. Yet the Government requests and obtains authority from equipment suppliers to operate rented equipment. (Please see Exhibit A.) The annual rental cost to the Government for this equipment and maintenance is in excess of $386 million. The failure of the Government to pay this bill monthly during the period of hiatus between contracts results in the industry incurring unwarranted interest costs at an estimated $3 million per month. These costs, of course, must be reflected in higher prices charged for this equipment and services, thus partially negating the goals of the Government's negotiation. The current conditions of industry profit squeeze and high interest rates accentuate this problem.

The Government has made efforts to correct this problem, principally by starting the negotiation process earlier in the year. It is understood that negotiations will start even earlier next year. This alone will not offer an adequate long term solution to the problem. Some 100 contracts are currently negotiated annually with prospects for even more in the future.

It is recommended that a comprehensive study be made of the GSA Federal Supply Schedule (ADPE) contracting procedures to determine ways to improve it. This would encompass an analysis of the various types of contracts to identify the problem areas and reasons for delay. Various alternatives should be explored, including:

- An increase in qualified negotiating personnel.
- Staggered contract periods to distribute the workload.
- Provision for continued payment for rented installed equipment and maintenance after expiration of one contract and prior to conclusion of negotiations on a new one. Provision could be made for retroactive adjustment following a new contract.
- Opening for negotiation only those sections of the current contract which are of particular concern to the parties.

The following benefits could be expected:

- Improved climate for negotiations.
- Participation in resultant lower base of cost/price.
- Lower cost of manpower commitment.
- Improved communication to user agencies.
- More stable environment for projecting costs in planning.

November 13, 1970

EXHIBIT A

"GENERAL SERVICES ADMINISTRATION"

"Federal Supply Service"
"Washington, D.C. 20406"

"Gentlemen:

"In the event a contract is not negotiated with your firm before July 1, 1970, in connection with Federal Supply Schedule FSC Group 74, Part VI, covering the rental, purchase, and maintenance of Automatic Data Processing Equipment, the Government requests authority to operate your rented equipment already installed or that equipment to be installed July 1 or thereafter. Confirmation is also requested that your firm will continue to maintain Government-owned and your rented equipment, after the expiration of your contract on June 30, 1970.

"The Government further requests after July 1, 1970, subject to your approval, that new Government requirements for rental, purchase, and maintenance will be acted on by your firm. Payment will be retroactive to July 1, 1970, and will be in accordance with the terms and conditions of your contract as may be negotiated for Fiscal Year 1971. Your immediate response will be appreciated."

"Sincerely,

/s/
"H. EBERLY, Chief
Contract Branch
ADP Procurement Division"

BUSINESS EQUIPMENT MANUFACTURERS ASSOCIATION

Before the

UNITED STATES TARIFF COMMISSION

In the Matter of

Investigation No. 332-61 Under
Section 332 of the Tariff Act of 1930
Into the Economic Factors Affecting the Use of
Item 806.30 and Item 807.00
Tariff Schedules of the United States

A. INTRODUCTION

In response to a request dated August 18, 1969, by the President of the United States, the U.S. Tariff Commission instituted an investigation of economic factors affecting the use of Items 806.30 and 807.00 of the Tariff Schedules of the United States (TSUS). The Commission published notice on September 3, 1969 of the institution of such an investigation and initially set public hearings to begin on November 18, 1969.

Following application by numerous affected parties, including the Business Equipment Manufacturers Association, other interested industries and their representatives, and the Tariff Commission itself, the President extended the reporting date from January 31, 1970 to August 31, 1970, and consistent therewith hearings were rescheduled to commence on May 5, 1970.

Pursuant to the Commission's request for information with respect to Item 807.00, BEMA has extensively examined its use by domestic manufacturers of business equipment. We have concluded that such duty treatment as is therein provided for U.S. manufactured components assembled abroad enables American manufacturers to compete more effectively in U.S. and foreign markets, and thereby contributes favorably to increased U.S. production, employment, and trade balances.

We, therefore, respectfully urge that the provision in the Tariff Schedules be retained.

The Provisions of the Tariff Schedules

Item 807.00 of the TSUS, one of several special classification provisions relating to articles exported and returned to the United States, provides for a partial exemption from duty for

> Articles assembled abroad in whole or in part of fabricated components, the product of the United States, where (a) were exported in condition ready for assembly without further fabrication, (b) have not lost their physical identity in such articles by change in form, shape, or otherwise, and (c) have not been advanced in value or improved in condition abroad except by being

> assembled and except by operations incidental to the assembly process such as cleaning, lubricating, and painting.

The rate of duty on such products is a duty upon the full value of the imported article, less cost or value of such products of the United States.[1]

Historical Treatment of Such Transactions

The historical basis for the type of duty treatment now codified in TSUS 807.00 is a product of the judicial and administrative interpretations of paragraph 1615(a) of the Tariff Act of 1930. Its current application is based upon testimony and other historical material prepared and submitted to Congress by the Tariff Commission pursuant to the Customs Simplification Act of 1954.

In 1954, the Customs Court,[2] in a decision involving the installation of an American-built motor in a Canadian-built boat, held that the American components were exempt from tariff levy because they did not advance the value of the motor or improve its condition and because identity of the American good was not lost by reason of the combination. This decision overruled an Administrative ruling by the Deputy Commissioner of Customs dated April 13, 1949, which had reversed practices in effect until that time.

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[1] Based upon reports received from BEMA's member companies, Item 806.30 does not presently play as significant a role in the production process of U.S. manufacturers of business equipment as does Item 807.00. While BEMA is of the opinion that many of those economic and policy considerations which support continuation of Item 807.00 are equally applicable to Item 806.30, this statement will be directed to the use by the business equipment industry of Item 807.00 only and to the implications of its repeal.

[2] C. J. Tower & Sons v. United States, 33 Cust. Ct. 14, C.D. 1628.

Applying the above decision, the Customs Bureau allowed duty-free[3] entry of American-made components assembled into foreign articles under the theory of "constructive segregation," (i.e., where components are capable of being identified and removed without injury to themselves or the articles into which they have been assembled). This test, and that which related to component advancement or improvement noted above, was considered arbitrary and unrealistic by the U.S. Tariff Commission. Consequently, in its codification of treatment afforded to U.S. components exported for assembly and return (now referred to as TSUS Item 807.00), the Commission expressed its view to Congress that the real issue in such cases is the matter of proof to be required that an American part has been assembled into the imported article

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3/ The expression "duty-free" in connection with such transactions is potentially misleading. In fact, goods and services of foreign origin are subject to full duty, as are profits and overhead related thereto.

and that it has been assembled therein without having changed its condition.

In the opinion of the Commission, therefore, Item 807.00 is not now based upon the theory of the absence of advancement or improvement. On the contrary, the present assumption is that there has been such, but allowable advancement or improvement is limited to "that which is brought about solely by the act of assembly." The "constructive segregation" or "removal without injury" concepts, the Commission urged, should be replaced by appropriate requirements for proof by the manufacturer of compliance with the provision itself.

In providing for assessment of duty on the basis of foreign value added, in the case of articles assembled abroad in whole or in part of products of the United States (Item 807.00), and the similar treatment accorded the processing of metals (Item 806.30), Congress has not singled out particular products for preferential treatment. On the contrary, the concept applied is not at all unique.

For example, Item 800.00 provides for duty-free entry for

> Products of the United States when returned after having been exported, without having been advanced in value or improved in condition by any process of manufacture or other means while abroad.

Similarly, Item 801.00 provides for duty-free entry of the following category of articles:

> Articles, previously imported, with respect to which the duty was paid upon such previous importation, if (1) reimported, without having been advanced in value or improved in condition by any process of manufacture or other means while abroad, after having been exported under lease to a foreign manufacturer, and (2) reimported by or for the account of the person who imported it into, and exported it from, the United States.

Scientific and educational exhibitions, as well as public exhibitions and those associated with circuses and menageries, are given duty-free treatment under TSUS Items 802.10, 802.20, and 802.30 as "articles returned after having been exported for use temporarily abroad."

Photographic films and dry plates manufactured in the United States (except motion-picture film to be used for commercial purposes) and exposed abroad are accorded duty-free treatment under provisions of Item 805.00.

Item 806.10 provides for a duty upon the "change in condition" with respect to books returned to the United States after having been exported to be advanced in value or improved in condition by any process of manufacture or other means. Likewise, under the terms of Item 806.20, articles exported for repairs or alterations are subject to a duty upon return based upon "value of repairs or alterations."

Substantial containers and holders, if products of the United States, are admitted duty-free upon return to this country.

Policy considerations inherent in each of these situations, and those involved in Items 806.30 and 807.00, were reflected in the statement of Congressional intent which was clearly enunciated by the Court of Customs Appeals in the case of *Denike* v. *United States* (5 Ct. Cust. Appls. 364, T.D. 3455[illegible]), wherein it was expressed:

> Having in mind the purpose of Congress to favor goods the growth, product, or manufacture of the United States, we think that merchandise imported into the country made up in part of American goods entitled to free entry and in part of goods not entitled to free entry should not be assessed for duty as entireties if the components of the importation are in fact distinct articles and so distinguished one from the other, that their several dutiable quantities, weights, measures, or values may be correctly ascertained.

B. THE BUSINESS EQUIPMENT INDUSTRY

Business Equipment Manufacturers Association

The Business Equipment Manufacturers Association is the trade association representing American computer and office machines and equipment manufacturers. Its member companies have been solicited by the Tariff Commission in connection with the investigation of use of Item 807.00 and have replied thereto with respect to their individual corporate operations.

The Commission will observe after analyses of those responses that manufacturers of business equipment and related products have made substantial use of Item 807.00 and have made significant investments in time and capital in off-shore assembly facilities and operations in anticipation of the continuing opportunity to utilize this provision of the Tariff Schedules.[4/]

Industry Products

The 70-plus companies which comprise current BEMA membership[5/] include major computer, office machine, and office furniture manufacturers. While product lines of those member companies vary widely, the following are intended to be illustrative: typewriters, bookkeeping machines, accounting machines, adding machines, calculating machines, electronic computers, addressing machines,

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4/ Unless otherwise stated, the statistical data included in this statement is confined to computers and office machines, which represent the principal use of Item 807.00 by BEMA member companies.

5/ See Appendix for list of members of BEMA.

duplicating machines, cash registers, dictating machines, check-writing machines, postage meters, folding machines, inserting machines, collating machines, office type staplers, office copying machines, keypunch machines, computer input and output devices, computer storage devices, computer communication devices, optical character readers, key data recorders, visual display devices, disc packs and drives, computer memories, remote terminals, data transmission equipment, and office furniture including desks, chairs, files, and visual equipment.

Sales

The contribution to the U.S. economy made by the companies comprising the business equipment industry has been, and will continue to be, significant. Statistical data with respect to the size and growth of the business equipment industry can convey only an incomplete picture, but is illustrative of the part this industry plays in the American way of life.

For example, values of business machines which in 1960 had been $0.8 billion[6/] had risen by 1969 to $10.9 billion. In 1970,

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6/ Patterns of Industrial Growth Shipments of Office, Computing, and Accounting Machines, 1958-1967, Issued April 1969, BDSA - U.S. Department of Commerce.

these figures are expected to reach $12.3 billion.[7]

From 1960 through 1969, expansion of industry shipments averaged 17 per cent a year.

Exports and Trade Balances

Exports of business machines over the years have been significant both in terms of their absolute value and of their contribution to our national objective of surplus trade balances.

Total value of exports of business equipment in 1969 exceeded $1.1 billion, an increase over the figure for the previous year of 37 per cent. In five years exports of business machines have more than doubled, as is evidenced by the following table:

U. S. EXPORTS OF BUSINESS MACHINES
(In millions of dollars)

1965	$ 479.9
1966	558.3
1967	783.5
1968	835.0
1969	1,100.0

Exports of computers have risen nearly fourfold since 1964, when $217.9 million in such equipment was shipped abroad. In

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[7] U.S. Industrial Outlook 1970, BDSA - U.S. Department of Commerce. These totals do not include the dollar value of much computer peripheral equipment.

1969, value of such shipments was $728 million.

Bookkeeping and accounting machines have for several years been the second leading category of business machines exports, representing 10 per cent of the total in 1969. By 1969, value of such shipments exceeded $119 million as compared with $87 million in 1967 and $42.6 million in 1964.

Photocopying equipment and statistical machines each accounted for $58 million in exports during 1969, or 5 per cent of the export total.

Surplus Trade Balances

As significant as the level of export sales of the products of this industry are, their contributions to our national policy objective of a favorable balance of trade is of equal consequence.

The principal contributors of this industry to that favorable trade balance are computers, bookkeeping and accounting machines, statistical machines, photocopying equipment, and typewriters.

In 1965, for example, exports of business machines ($479.9 million) exceeded imports by over $336 million; in 1966 that surplus was $367.5 million; in 1967 exports of $783.5 million represented a trade surplus of nearly $559 million.

By 1968 exports had risen to $835 million, yielding a surplus of $576 million.

Finally, last year, exports of business machines provided the U.S. economy with a plus factor in the trade balance of $725 million, when exports exceeded $1.1 billion, a new record.

Imports

Notwithstanding these favorable trade balances, we have witnessed in recent years a substantial increase in imports of business equipment consisting primarily of less sophisticated product lines.

For example, imports of calculating machines, which represented 29 per cent of total imports of business machines in both 1968 and 1969, led the list in both years. Typewriters and parts were second, with 19 per cent in 1969 and 26 per cent in 1968. The remaining products comprising the list of principal imports of business equipment are adding machines, office copying machines, data processing machines, and parts for all office machines.

Employment and Income in National Perspective

From 1960 to 1968, the total number of employees in the office machine, equipment and computing industry increased 67 per cent, while the employment in all manufacturing operations increased by only 18 per cent.[8]

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[8] Employment and Earnings, 1969 Revision, U.S. Department of Labor (unpublished).

In the same time period, the number of production workers in the office machine, equipment, and computing industry increased by 40 per cent, while the number of production workers in all manufacturing increased by only 15 per cent.[9]

Earnings of production workers in the office machine and computing industry have been historically attractive. For example, weekly earnings in this industry in 1968 were $137.45 compared to $122.51 for all manufacturing. Average hourly earnings of production workers showed a similar pattern in 1968, being $3.32 for this industry as compared with $3.01 for all manufacturing.[10]

Further illustrating the favorable employment pattern of the office machine and computing industry are comparative data on the three industry divisions, separately, with all manufacturing operations. Because government statistics by divisions are comparable only for the years 1964 through 1967, this period is used for this purpose.[11]

Total Number of Employees by Industry Divisions

While the total number of employees engaged in manufacturing increased by only 12 per cent from 1964 to 1967, the total number for computing machines increased 40 per cent, for typewriters 41 per cent, and for other office machines 25 per cent. For the office and computing machines industry as a whole, the total number increased 38 per cent compared to the 12 per cent for all manufacturing.[12]

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[9] Employment and Earnings, 1969 Revision, U.S. Department of Labor (unpublished).

[10] *Ibid*.

[11] As product classifications of the Industry Divisions are revised from time to time, only the period 1964-1967 can be used for these comparisons.

Total Payroll by Industry Divisions

Total payroll increased only 24 per cent for all manufacturing employees from 1964 to 1967. This is to be contrasted with comparative figures for computing machines, where the increase was 51 per cent, for typewriters 51 per cent, and for other office machines 34 per cent. In the office and computing machines industry as a whole, the increase was 49 per cent as compared to 24 per cent for all manufacturing.[13]

Number of Production Workers

For all manufacturing, the increase in number of production workers from 1964 to 1967 was only 13 per cent; for computing machines it was 36 per cent; for typewriters 42 per cent; and for other office machines 21 per cent. For the office and computing machines industry as a whole, the increase was 35 per cent as compared to 13 per cent for all manufacturing.[14/]

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[12] Industry Profiles 1958-1967, U.S. Department of Commerce, Business and Defense Services Administration.

[13] *Ibid*.

Total Wages of Production Workers

For all manufacturing, total wages of production workers increased only 23 per cent from 1964 to 1967; for computing machines they increased 44 per cent; for typewriters, they increased 58 per cent; and for other office machines, they increased 29 per cent. For the office and computing machines industry as a whole, the increase was 44 per cent as compared to 23 per cent for all manufacturing.[15/]

C. BASIS FOR UTILIZATION OF ITEM 807.00 GENERALLY

The Need to Compete Effectively

The business equipment industry's remarkable growth pattern, its export levels, contributions to favorable trade balances, employment levels and the attractive income opportunities it affords are a direct product of its ability to compete in the world market. The ability of the U.S. segment of this industry to continue this upward course depends upon the flexibility it

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[14/] Industry Profiles 1958-1967, U.S. Department of Commerce, Business and Defense Services Administration.

[15/] Ibid.

is afforded in meeting challenges from its foreign counterparts.

Business equipment manufacturers face constant and increasing pressure from abroad to reduce costs to perpetuate initial competitive advantages which have generally resulted from initiative in new product development in this country. Experience has shown, however, particularly with respect to less sophisticated equipment, that foreign manufacturers are steadily increasing their share of the world market. Typewriters are an excellent case in point.

As a consequence, unless U.S. manufacturers are to abandon the fruits from production of their invention and engage only in the exercise of research, they must find ways to compete effectively for domestic and foreign sales of products -- subsequent to the time when the technology of a new product has become available to the rest of the trading world.

In some cases, use of foreign-based assembly operations for American manufactured components has proven a key element in enabling the U.S. manufacturer to compete effectively against the foreign manufacturer in the U.S. market and in foreign markets. That is what Item 807.00 is all about -- and that is the basis for opposition of business equipment manufacturers to its repeal.

D. PRINCIPAL IMPETUS TO ITEM 807.00 TYPE OPERATIONS

Members of the Business Equipment Manufacturers Association, as manufacturers of a wide range of products, are subjected to a variety of competitive conditions. As a consequence, they utilize Item 807.00 for a number of reasons, all of which are directed at the improvement of their competitive position with respect to foreign competition within the United States as well as in foreign markets. These reasons include, but are not limited to the following:

(1) The incentives provided by the U.S. government and foreign governments to encourage U.S. investment of capital and know-how in foreign countries. These incentives include tariff considerations themselves, special tax considerations, and others specifically designed to encourage such business decisions. Illustrative of such incentives are the Specific Risk Investment Guaranty Program and the Mexican Border Development Program discussed below.

(2) Competitive pressure from foreign manufacturers generally and manufacturers, both U.S. and foreign, who are utilizing offshore assembly operations to improve their own competitive positions.

(3) Availability of a large labor pool at wage rates such as to enable U.S. manufacturers to secure product cost reductions, and

thus free U.S. workers to perform more highly skilled operations.

(4) Use of multiple plants in particular operations, thus yielding greater production flexibility. Conditions which encourage use of U.S. manufactured components plus additional U.S. processing subsequent to importation of assembled articles lead to better product harmonization than is possible in the case where foreign-made parts or more extensive foreign operations are involved.

(5) Use of Item 807.00 concepts enabling manufacturers to exercise greater production and quality control than would alternative methods of production, particularly those which would involve an increase in the use of foreign components in the ultimate product.

(6) Use of foreign assembly operations, thus reducing the unit cost of production, which, when coupled with duty savings available as a result of Item 807.00, increases the U.S. manufacturers' competitive position and results in reduced costs to the consumer.

(7) Use of off-shore facilities as part of a production process, thus increasing sales in the host country, both directly from plant, and re-exports of fully assembled equipment from the United States.

Improvement of the competitive position of U.S. companies utilizing off-shore production facilities and Item 807.00 results in the enhancement of employment opportunities for U.S. workers, and facilitates the granting of wage and benefit increases consistent with their increased productivity.

Furthermore, by increasing the ability of U.S. manufacturers to compete in foreign markets and to compete against foreign imports in U.S. markets, and by counteracting the tendency, in many product lines, of complete substitution of foreign-manufactured assemblies for assembly processes currently carried out under Item 807.00, the program results in a positive contribution to the U.S. balance of payments.

Participation by U.S. firms in elevation of productive capabilities of developing nations contributes significantly to this nation's overall trade and foreign policy.

In summary, repeal of Item 807.00 would have a significant adverse impact upon U.S. industry as a whole and upon American workers, the business equipment industry in particular, the U.S. balance of payments position, and U.S. foreign trade policy generally.

E. ILLUSTRATIVE USES OF ITEM 807.00

U.S. business equipment manufacturers utilize Item 807.00 in connection with the assembly of a wide variety of products, most of which are subsequently made component parts of more sophisticated equipment by application of U.S. labor and technology. The host countries of such off-shore production facilities span the globe, and include such countries as Mexico, Korea, Taiwan, Canada, England, Italy, Brazil, and Hong Kong.

Among the products assembled abroad and thereafter imported under this Tariff Schedule are storage plane assemblies, coils, disc packs, logic card assemblies, digital computer card assemblies, memory stacks, cores, transformers, and other products.

The following are intended only to be illustrative of the types of U.S. components involved and the nature of foreign assembly processes applied thereto:

U.S. manufactured cores, frames and boards for storage plane assemblies are wired, soldered, assembled, inspected, and tested by foreign workers. Upon return to the U.S., the storage plane assembly becomes a component of a computer.

Cores, plane sub-assemblies, diode modules, connectors and eyelets are shipped abroad, where mats are soldered and wired, inspected, and tested, and are later used, upon return to the

U.S., as parts of computer storage modules.

Logic cards are assembled abroad from U.S. manufactured boards, transistors, component connectors, wires and blocks for subsequent installation by U.S. workers in various types of electrical equipment.

U.S. manufactured printed circuit cards, transistors, resistors, capacitators, and other components are assembled into printed circuit boards which, following further processing in the United States, become part of end item computer peripheral equipment.

Memory stacks are assembled from ferrite cores, printed circuit boards, and wired and returned to the United States for further assembly and testing.

Wire, coil winding forms laminations, mounting brackets, lead wire, and insulating material is exported for assembly into transformers. These assemblies are subsequently further specially processed in the U.S. to customer specifications.

This list could continue and, in connection with this inquiry, the industry has provided the Tariff Commission with a number of other illustrative examples of U.S. products which are assembled in off-shore facilities and of the nature of these assembly processes.

F. THE EFFECT OF ITEM 807.00 OPERATIONS UPON COMPETITIVE CAPABILITY AND U.S. WAGE EARNERS

The Need to Remain Competitive and Its Impact Upon American Workers

The principal competitive benefit presently associated with products subject to off-shore assembly and Item 807.00 duty treatment is to enable the U.S. manufacturer of the completed unit of business equipment to compete in the world market against foreign manufacturers whose costs of production are almost universally lower, particularly with respect to those products which are labor intensive. Where U.S. components which have been subjected to off-shore assembly are eventually sold in the U.S. market (in themselves or as components of more complex end products), they are generally found to be competing against products of wholly foreign origin rather than those of U.S. manufacture.

Opponents of Item 807.00 and similar provisions claim, without substantiation, that the availability of encouragements to export for assembly and return deprives American workers of actual jobs and potential employment. The facts simply do not bear out these claims.

We have previously described the present and historic employment patterns characterizing the business equipment industry. Total employment of all types and employment levels for production workers are at record highs. Given the opportunity for flexibility in production such as that currently afforded by Item 807.00, the U.S. industry will continue to be competitive and provide an increasing opportunity for the American worker.

Business equipment manufacturers engaging in off-shore assembly operations are experiencing total U.S. employment increases almost without exception. The substantial data received by the Commission during this investigation should serve to document this condition, notwithstanding unfounded assertions to the contrary by opponents of Item 807.00.

Turning specifically to those U.S. plants directly associated with Item 807.00 operations, as a result either of component production for export, production of assembled components identical to those imported, or further processing of imported assemblies, the general employment picture must be said to portend a favorable impact upon the U.S. worker, both in total employment and in income levels.

In nearly all instances with which we are familiar, total employment and employment of production workers in these plants showed increases in 1968 and 1969. Available data indicates that the composite impact of these operations is characterized by increased total production, higher levels of employment, generation of new plant openings, and a general elevation in the skill level utilization of U.S. workers. Company data submitted indicates that in those instances where commencement of foreign assembly operations has appeared to produce a reduction in U.S. employment, intra-company adjustments have been made in such a way as to maximize the skill utilization of the U.S. worker upon reassignment and to protect his earnings.

Analysis of available and relevant data leads unavoidably to the conclusion that overseas employment in business equipment assembly operations is inconsequential when considered in the context of the dynamics of the U.S. business equipment industry as a whole and U.S. based work associated with such assembly operations. The true impact of such operations upon U.S. labor can only be assessed by the process of such a comparison.

Other Points

Opponents of the use of off-shore assembly of U.S. components have not limited their attack to the general claim that such operations deprive U.S. labor of job opportunities. They offer a number of other equally unsupported contentions, three of which manufacturers of business equipment wish to treat specifically at this point.

It is urged upon the Commission and the public that laws which facilitate use of foreign workers to assemble U.S. manufactured components make difficult efforts by U.S. workers to improve their own wages and working conditions. What has been heretofore said concerning the wage and salary levels of U.S. workers, production or otherwise, in the business equipment industry should sufficiently discredit such claims.

There is likewise the demand that U.S. industry employ disadvantaged American workers in the tasks currently performed by foreign workers abroad. There is a certain superficial logic to such an approach. However, this argument assumes that use of foreign-based assembly operations reduces job opportunities in the United States, which is simply not the case. Furthermore, it ignores the substantial contributions made by business equipment manufacturers in the training and education of the disadvantaged.

Finally, there is the proposition that American industry pays "substandard" wages to foreign workers and thus perpetuates a condition of deprivation. We submit that the employees in each of the facilities engaged in off-shore assembly of U.S. business equipment components for export to the United States, including production workers in those facilities, are receiving wages and fringe benefits at least equal to the prevailing rate in the host country. These facilities serve to increase the standard of living in the host countries by providing jobs for those without employment, increased earnings opportunities for those who wish to better themselves, increased skills and productivity, and for the countries a means for improving their economic base.

It is interesting to note that those who accuse U.S. industry of contributing to the perpetuation of what they describe as "substandard" living conditions in developing nations urge adoption of restrictive trade policies which would prevent those very workers from taking advantage of the demands of international commerce to increase their living standards.

G. PROBABLE EFFECTS OF THE REPEAL OF ITEM 807.00

Because of the diversity of business equipment components assembled abroad under Item 807.00, the variety of end product uses, and the differences in competitive position and size of companies involved, the consequences of repeal of Item 807.00 would vary from company to company. To claim that they would be uniform throughout the business equipment industry would be a generalization as inappropriate as many of those being made by opponents of the provision.

However, business equipment manufacturers are of the view that such a repeal would adversely affect their competitive positions and ultimately the well-being of U.S. workers, and believe that facts and data available to the Commission unequivocally support such a conclusion.

It is apparent that a number of U.S. plants doing component manufacturing and further processing on Item 807.00 assembled articles will be forced to close their doors. In other instances, that result will be avoided only by a consolidation of facilities. Plant expansion will most assuredly be curtailed, and some actual plant relocations to foreign bases should be anticipated.

Repeal in some instances might result in a closing down of foreign assembly operations or the increasing use of automation. In other situations, the same assembly operations would be carried out but on foreign-made components rather than those produced in the United States.

Illustrative of the component source shifts which are likely to be precipitated should Item 807.00 be repealed is this report by one of our manufacturers who currently assembles recording heads for disc files from U.S. components in Mexico. Qualified Mexican-based sources are anxious to supply the flux additives, solder bars, ferrites, core memories, diodes, expoxy, lapping compound, antifoam, magnet wire, and the 15 different wires used in the recording head assembly.

Still other manufacturers would be forced to resort to purchase of components from outside foreign sources -- or in some cases an even more extensive part of the final product -- even to the extent of complete foreign manufacture followed by marketing under a U.S. brand name.

Item 807.00 is being used only in those cases where the U.S. manufacturer in question is able to reduce his unit costs thereby. Its elimination, of necessity, will force recourse to alternative means of avoiding the impact of cost increases. In cases where the manufacturer chooses to attempt domestic assembly of components previously assembled abroad, he will be forced to automate to minimize his increased costs. Failure to do so would result in lost sales to both foreign manufacturers and U.S. manufacturers taking more effective steps to offset the impact of repeal of these provisions of the Tariff Schedules. It should be apparent that the net impact of elimination of these provisions will be higher production costs or increased utilization of foreign components -- the consequences of either alternative being unfavorable to U.S. laborers.

There persists the fallacious assumption by some of the most outspoken advocates of repeal of Item 807.00 that the consequences of its revocation will be an increase in jobs for U.S.

assembly workers -- man for man. Nothing could be further from the truth. In fact, only by the coincident adoption of restrictive import quotas on the entire range of end products now assembled from U.S. components would this be a noticeable consequence of repeal, and then only on a short term basis.

An objective evaluation of the comparative cost of production data made available to the Commission by business equipment manufacturers leads unavoidably to the conclusion that the relative increases in cost of production of components wholly assembled in the United States would be prohibitive. Estimated increases of production costs approximating 100 per cent are not uncommon. Given these facts, the argument that repeal of Item 807.00 will benefit U.S. workers is patently untenable.

The impact of repeal of Item 807.00 would be felt, of course, in our export capabilities as well as in domestic sales. Any serious erosion of the ability of the business equipment industry to export sophisticated business equipment will have dramatic consequences in our balance of payments position. The disruptive impact upon our trade balance position will be compounded by virtue of reduced exports of American-made components. Further aggravation will result because of the increased substitution of foreign-made for American-made components, not to mention increases in U.S. purchases of foreign-made end products.

In its deliberations, the Tariff Commission should note especially that the detrimental impact of a repeal of this provision will be focused directly upon U.S. industry. Competing foreign manufacturers who are themselves making use of off-shore production facilities will receive, by virtue of a repeal of Item 807.00, a relative advantage over the American manufacturer. The total value of that advantage will, at a minimum, equal the amount of duty increase. The impact would be considerably greater in those cases where repeal forced a cessation of use of the off-shore facilities themselves.

In this connection, the likelihood of retaliation by countries presently hosting assembly facilities must not be overlooked.

H. OTHER FACTORS RELEVANT TO THE ISSUE OF ITEM 807.00 REPEAL

In his request to the Tariff Commission for an investigation of the relevant economic factors affecting the use of Item 807.00, the President enumerated categories of information to which the manufacturers of business equipment, through this statement and their individual responses to the Commission inquiries, have addressed themselves. The President, however, further directed that the Commission should not limit itself to the enumerated "relevant economic factors" in making its analysis.

The Business Equipment Manufacturers Association fully concurs with the President's recognition that there are other relevant and important considerations relating to possible repeal of Item 807.00 which must be evaluated.

While it is our opinion that based upon its economic aspects alone the Commission should find and the President should conclude that Item 807.00 should be left intact, there are a number of other related factors which deserve careful consideration and reflection -- each of which further militates against a change in the tariff treatment of assembled components of U.S. origin. Included among these factors are:

Reliance by Industry

In considering possible investment in manufacturing facilities abroad, American business must in each instance calculate the feasibility of such a venture. The duty treatment to be accorded products imported from these facilities is a factor, in some cases a critical factor, in making such a determination.

Reversal of the long-standing policy represented by Item 807.00 would adversely affect those who relied upon it to their detriment, and would be contrary to basic equity. Particularly would this be the case in the absence of a strong showing that other considerations of public policy dictated such a reversal.

Repeal Contrary to Policy of Tariff Schedules

The Tariff Laws and Tariff Schedules of the United States are designed to tax foreign goods for the encouragement of American industry and protection of American labor. Imposing a tariff upon components or products clearly of American origin -- the direct consequence of Item 807.00 repeal -- would be contrary to the basic concept and purposes of the Tariff Schedules themselves, as reflected in numerous analogous provisions discussed previously in this statement.

Discrimination Against U.S. Components Assembled Abroad

Placing an additional tax upon the U.S. component value of a product assembled in an off-shore facility would constitute a discrimination against those components with respect to identical components assembled within the U.S. borders. There is no legitimate or justifiable policy basis for such discrimination.

Controvention of Overall U.S. Trade Policy

Repeal of Item 807.00 and discouragement of off-shore assembly operations thereunder would be inconsistent with overall U.S. trade policy, as enunciated or reflected in the President's foreign policy and trade messages, various recommendations of Presidentially constituted task forces on trade policy, and a wide variety of existing federal programs.

Rockefeller Report on the Americas

Such a repeal would be contrary to the conclusions and recommendations of "The Rockefeller Report on the Americas," the official report of a United States Presidential Mission for the Western Hemisphere prepared by Nelson A. Rockefeller in 1969 at the request of President Richard Nixon. With respect to this country's policies on the economic and social development of the underdeveloped republics in the Western Hemisphere, that report observed:

> Our common objective -- to improve the quality of life for all individuals in the hemisphere -- can only be accomplished by working together to accelerate the rate of economic and social development. Hemisphere interdependence in these matters is more than a theory. It is a fact of life. (p. 65)

Referring to the matter of trade policy, Mr. Rockefeller observed:

> Trade policy is the central economic issue facing all Western Hemisphere nations. Freer access to markets in the United States and other industrial countries is essential to support accelerated economic progress. Provision of such opportunities poses problems of adjustment for the industrial nations in terms of jobs and investment. The challenge is to work together to develop a practical approach which will be in the best interests of all hemisphere nations.

> Expanding export trade is the soundest and most important way the other American republics can finance the imports needed for broad development. (pp. 70-71)

The report continues with observations relating to the matter of private savings and investment as follows:

> Accelerated economic growth will require increasing flows of private investment, local and foreign. Yet in all too many cases, private savings and investments are held back by ... complex government controls and restrictions. (pp. 88-89)

Based upon such observations, the Rockefeller Task Force proposed as a national policy objective that "the United States should provide maximum encouragement for private investment throughout the hemisphere." Stated in terms of a recommendation for action, it noted:

> The United States should not, for narrow domestic reasons, apply tax rules to United States private overseas investment which controvert efforts by developing nations to encourage private investment and promote joint ventures. (p. 89)

While making no specific reference to tariff classifications at this point, it seems clear that parallel policy considerations are implicit in the recommendation.

The report also urged:

> Improved mechanisms should be sought to bring together United States private investors and companies elsewhere in the hemisphere which are seeking United States partners. (p. 94)

Having completed his analysis of matters relating to economic and social development, Mr. Rockefeller treats separately the matter of the hemispheric division of labor. He states:

> In essence, what we the people of the Western Hemisphere really need is a more efficient division of labor among us.
>
> This principle of the division of labor underlies the progress of modern nations. Within national boundaries, the forces of competition in the market lead to specialization -- a division of labor. Individuals and companies turn to what they can produce most effectively because that yields the greatest returns. Thus one company will concentrate on the production of ax handles while another will specialize in producing ax heads. The result will be better axes, lower prices to consumers, and higher returns to workers and employers.
>
> The same principles apply internationally. All participants gain from the freest possible exchange of exports and imports, since that promotes an international division of labor. Each nation concentrates on items it can produce with relatively greater efficiency and lowest costs. It trades these items for those which other nations can produce with selectively greater efficiency. Everyone gains in the process, just as they do in the division of labor within national boundaries.
>
> * * * * * * * * *
>
> In a real sense, the failure to develop a full division of labor in the Western Hemisphere can be termed inhumane. The

> excess production of certain farm products and raw materials in the less developed countries results from protectionism in the industrial nations which slows the pace of industrialization in the less-developed nations. With overproduction, prices of such farm products and raw materials sink to levels which yield no more than a bare subsistence return to most of the individuals producing them.
>
> It has been objected in some quarters of the United States that the adjustments involved in a move toward a greater international division of labor would prove too painful to be borne. There would be adjustments, and an effective program would be needed to help affected workers and businesses to make the transition to more productive pursuits. (pp. 101, 102, 103)

Manufacture of business equipment through the feeder plant concept, utilizing foreign workers for the assembly of U.S. manufactured components, is a classic example of the effective use of a division of labor such as is envisaged in the Rockefeller Report. The standard of living of the employees and the industrial base of the host country are increased by the assembly operations. Reduced costs of assembly increase demand both for the U.S. manufactured components and the end product. At the same time, more highly skilled U.S. laborers are freed to perform higher level functions, increasing their own productivity and living standards.

Peterson Report on International Development

On March 4, 1970, the Task Force on International Development, chaired by Mr. Rudolph A. Peterson, President, Bank of America, filed its final report with President Nixon. The conclusions of the Task Force, in outlining what it described as "U.S. Foreign Assistance in the 1970's" included the following:

> 1. The United States has a profound national interest in cooperating with developing countries in their efforts to improve conditions of life in their societies.
>
> * * * * * * * * *
>
> 7. The United States should help make development a truly international effort. A new environment exists: other industrial countries are now doing more, international organizations can take on greater responsibilities, trade and private investment are more active elements in development, and, most important, the developing countries have gained experience and competence.

Referring to needed changes in international development, the Task Force emphasized:

> In the future, the developing countries will have to export more manufactured goods. Their traditional exports of primary commodities have only limited growth possibilities, but the developing countries are becoming more competitive in manufactured goods. Whether they can capitalize on their new capabilities will depend on whether industrial countries open their markets to this competition ....

Recognizing that U.S. policies relating to international development go beyond foreign assistance programs, the Task Force dealt in detail with the matter of trade and investment. With respect to private incentives and market forces, it noted:

> Both in the United States and abroad, there is misunderstanding about the contributions of the private sector, the role of profits, and the benefits of the price mechanism. In some developing countries, private foreign investment has been under attack, partly because of an anachronistic view of how foreign companies operate abroad. There are now encouraging signs of a change in attitudes, as exemplified by a recent report prepared for the United Nations Conference on Trade and Development (UNCTAD) on the role of private enterprise in development.
>
> * * * * *
>
> In the most successful countries, the value of encouraging private initiative has been amply demonstrated. It has made possible more employment opportunities, an upgrading of labor and management skills, a rise in living standards, and wider participation in the benefits of development. Furthermore, a dynamic private sector has resulted in greater internal savings, more effective use of domestic and foreign investment resources, and rapid economic growth, in which export industries have played an important role.
>
> 1. Trade. Expansion of trade enhances the scope of the private sector and stimulates private initiative and investment. Developing countries cannot be expected to reach the point of financing their own

> development unless they are given the opportunity to earn the means for doing so through an increase in their exports.
>
> However, if a policy of promoting exports is prescribed for developing economies, accepting imports is one of the responsibilities of industrial countries. Providing better access for the products of developing countries offers both advantages and difficulties for industrial countries.
>
> ...cheaper imports and a larger volume of trade would add to the real incomes of all participating countries and help to contain inflationary pressures. Of course, they also might result in adjustment problems. But, difficult as such adjustment problems sometimes are, they are temporary. They occur continually in our dynamic society as an essential element of a competitive economy. They highlight the need for effective adjustment assistance measures as a foundation for constructive U.S. trade policies. The adjustment assistance provisions of the Trade Bill now before the Congress would help to meet this need.
>
> Enlightened trade policies toward developing countries are an essential element in achieving international development. The Task Force urges continued U.S. leadership in working for the reduction of tariffs and other obstacles to trade and in avoiding the imposition of new restrictions. (emphasis added)

Particularly relevant to a consideration of the role of trade policies such as those represented by Item 807.00 are the Task Force's observations on U.S. foreign private investment policy:

> The policies of American firms operating abroad are an important determinant of the investment climate. In the past, the need to give more managerial responsibility to nationals of the host country and to establish good working conditions has been emphasized. Equally important to international development as good relations with the host country are active efforts by subsidiaries of U.S. companies and other foreign firms to export goods from developing countries.... (emphasis added)

In a related area the Task Force urged that recommendations for facilitating an increase in the flow of private investment to the developing countries be considered in the examination of business taxation currently underway within the U.S. government.

The relevance of the principal recommendations of this report, as well as those of the Rockefeller Report, to the Commission's investigation is unmistakable. The implications of Item 807.00, both with respect to encouragement of U.S. private investment in underdeveloped countries, and the opening of this nation's doors to the industrial product of those countries, are in complete accord with these recommendations.

Specific Risk Investment Guaranty Program

Repeal of Item 807.00 would be contrary to U.S. Foreign Policy objectives such as those reflected in the Specific Risk Investment Guaranty Program.

The United States government, recognizing the vital role which U.S. business can play in assisting other countries toward self-sufficiency, has provided numerous incentives designed to encourage the investment of private capital and know-how in developing nations. Among such incentives are tariff considerations themselves, special tax considerations, and other specific incentives such as the Specific Risk Investment Guaranty Program. The present program, which was authorized by the Congress under the Foreign Assistance Act of 1961, and administered by the Agency for International Development (AID), is designed to encourage the transfer to less developed countries of capital and techniques in furtherance of their economic development and to increase their productive capabilities. By insuring against political risks inherent in such ventures, this guaranty program not only encourages foreign investment, but also tends to equate foreign with domestic investment opportunities. That this program and the participation of U.S. industry under it are actual operating instruments of U.S. foreign policy is borne out by the fact that guaranty agreements have been signed between the United States and more than 75 countries. In addition, such guaranties are also available in a number of dependencies of developed nations, including the United Kingdom.

The Investment Guaranty Program is only representative of actions by the U.S. government to encourage foreign investment. Others include the Foreign Direct Investment Program of the Department of Commerce; Congressional exceptions with respect to investment in developing countries in the foreign investment controls adopted in 1968; and the continuing activities of the State Department and the Agency for International Development to assist business in overseas investment. The thrust of current efforts to repeal items 806.30 and 807.00 of the Tariff Schedules, if accepted by the U.S. government, would be a reversal of an important aspect of our foreign policy with respect to many of the developing nations represented by such programs as the Specific Risk Investment Guaranty Program.

Because of the adverse effects of such a reversal upon U.S. businesses relying upon these provisions, such precipitous action could also seriously undermine future efforts to involve cooperation of private business in other matters relating to investment policies, foreign or domestic.

Mexican Border Development Program

As a part of its effort to enhance the standard of living of its people, the Mexican Government inaugurated the Border Development Program in the early 1960's. Under it, wholly owned subsidiaries of foreign enterprises are permitted to incorporate in Mexico.

In addition to duty-free import of machinery, supplies, and raw material, other privileges extended to such corporations include issuance of work permits to key personnel and the leasing of real estate within 60 miles of the border -- a practice otherwise forbidden. By mid-1969, 103 such plants were in operations, of which approximately one-third involve assembly of electronic equipment. While not the principal impetus to such operations, U.S. tariff laws (Item 806.30 and 807.00, in particular) are a definite factor making participation of American industry in Mexican industrial development feasible.

The program has provided substantial employment gains in Mexico and has gone far in improving the outlook for communities on the American side of the border, according to recently published studies.[16] Not only is employment on the increase, but the quality of the labor force has risen as well.

Contrary to the arguments of its detractors, the program will improve the economy of the area affected -- on both sides of the border. Claims that imports from Mexico cause net unemployment in the United States cannot be substantiated. In fact, studies conducted on this matter point to the contrary.[17] In addition to improving the standard of living for the Mexican workers involved, the generally favorable balance of trade which the U.S. enjoys with Mexico indicates that dollars expended on Mexican exports are respent in the United States.

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[16] Business Review, Federal Reserve Bank of Dallas, February 1970.

Increased expenditures on U.S. retail and other trade by Mexicans will provide more jobs and income for U.S. citizens, as will anticipated increases in industrial development on the U.S. side of the border.

For the U.S. government to recognize, as it does, the economic benefits to this country of the Mexican Border Development Program -- and at the same time seriously consider repeal of Item 807.00, one of the key incentives provided by it to participation in that program by our industry -- is indeed incongruous.

Repeal of Item 807.00 Would Be Contrary to the Policies Enunciated in the President's Trade Message of November 18, 1969 and the President's Foreign Policy Message of February 18, 1970

On November 18, 1969, President Nixon sent to the Congress his first message on Foreign Trade. He made it unmistakably clear that his trade policies would be based upon a recognition of the international marketplace as it is, and that in his opinion a policy of freer trade was in the nation's best interests.

---

[17] See, e.g., "Industrial and Employment Potential of the United States - Mexico Border," U.S. Department of Commerce (December 1968).

In speaking of changing policies in world trade, the President observed:

> First, world economic interdependence has become a fact. Reductions in tariffs and in transportation costs have internationalized the world economy just as satellites and global television have internationalized the world communications network. The growth of multinational corporations provides a dramatic example of this development.
>
> * * * * * * *
>
> The disappearance of the surplus has suggested to some that we should abandon our traditional approach toward freer trade. I reject this argument not only because I believe in the principle of freer trade, but also for a very simple and pragmatic reason: *any reduction in our imports produced by U.S. restrictions not accepted by our trading partners would invite foreign reactions against our own exports -- all quite legally*. Reduced imports would thus be offset by reduced exports, and both sides would lose. In the longer term, such a policy of trade restriction would add to domestic inflation and jeopardize our competitiveness in world markets at the very time when tougher competition throughout the world requires us to improve our competitive capabilities in every way possible. (emphasis added)

Clearly, repeal of provisions such as Item 807.00 would represent a significant departure from the President's statement of policy. Because Item 807.00 makes a substantial contribution to U.S. trade and foreign policy objectives *and at the same time* improves the competitive position of U.S. firms, consideration of its repeal would be doubly unsound.

The President also spoke directly to the matter of economic development of less developed nations. In this regard he stated:

> Fourth, the less developed countries need improved access to the markets of the industrialized countries if their economic development is to proceed satisfactorily.

As a part of the investigation into the use by American industry of Items 806.30 and 807.00, the Commission has received and reviewed extensive questionnaires from in excess of 100 U.S. companies currently utilizing these provisions of the Tariff Schedules. If the experience of the business equipment industry is representative, and we believe it to be so, the less developed countries to which the President referred in his Trade Message are principal locations for 807.00 facilities. To this extent, Item 807.00 itself represents a preference for "exports" from less developed nations. These plants do contribute in a substantial way to the economic development of the host countries -- and at the same time provide a direct reciprocal benefit to U.S. manufacturers and their employees.

A turnabout in U.S. trade policy which threatened to produce or actually precipitated a withdrawal of such facilities would likewise adversely affect this country's relations with the foreign nations involved. Previous mention has been made of the likelihood of economic retaliation by host countries. As a practical matter, the U.S. would seek to substitute other forms of assistance. History should by now have convinced us that these alternatives are not only more expensive, but less effective instruments of national policy.

Consistent with the views earlier expressed in his Trade Message, the President provided still further elucidation of his trade policies in his foreign policy message delivered to Congress on February 18, 1970. The President stated:

> Freer trade among all nations provides greater economic benefits for each nation. (Cong. Rec., 2/18/70, H938)

Mr. Nixon specifically referred to his trade policy objectives with respect to developing nations in these terms:

> Finally, we proposed a liberal system of tariff preferences for exports of the developing countries.
>
> This proposal is designed to meet one of the world's major economic and political problems -- the struggle of the developing countries to achieve a satisfactory rate of economic development. Development can be promoted by aid, but aid cannot and should not be relied on to do the whole job. The low-income countries need increased export earnings to finance the imports they need for development. They need improved access for their products

> to the massive markets of the industrialized nations. Such export increases must come largely in manufactured goods, since the demand for most primary commodites -- their traditional exports -- grows relatively slowly. (Cong. Rec., 2/18/70, H939)

Referring to "international responsibility for development of less developed nations," the President said:

> The international economic successes of the past have been mainly among the industrial nations. The successes of the future must occur at least equally in the economic relations between the industrial nations and the developing world.
>
> * * * * * * * *
>
> And it is increasingly understood among developed and developing nations that economic development is an international responsibility. (Cong. Rec., 2/18/70, H939)

In this same context, the President clearly recognized the role of private investment in such a program:

> Private investment must play a central role in the development process, to whatever extent desired by the developing countries themselves. I proposed, and Congress has authorized, an Overseas Private Investment Corporation to improve our efforts to make effective use of private capital. And we have given special attention to the developing countries in

> our relaxation of restraints on foreign investment by U.S. corporations. 18/
>
> Trade policy must recognize the special needs of the developing countries. Trade is a crucial source of new resources for them. Thus, as already described, I have proposed and am urging a worldwide and comprehensive system of tariff preferences for the products of developing nations. (Cong. Rec., 2/18/70, H939)

In treating both overall trade policy and this nation's special obligations to developing nations, the President's message could not be more clear. It is equally clear that Items 806.30 and 807.00 are effective and appropriate instruments for pursuit of those policies and, in addition, it should be fully recognized that repeal of these provisions would be internationally regarded as clear repudiation of such policies.

18/ The President's views with respect to U.S. investment abroad parallel those of President Eisenhower as expressed in a Special Message on Foreign Economic Policy which he delivered to Congress on January 10, 1955. In that message, he noted:

> [T]he flow of capital abroad from our country must be stimulated and in such a manner that it results in investment largely by individuals and private enterprises rather than by government.

Presidents Kennedy and Johnson held similar views with respect to the role of private investment in the economic growth of developing nations.

To repeal such provisions would not only be inconsistent with carefully enunciated U.S. trade policy objectives, but such a reversal would unquestionably impair the President's ability to secure cooperation and participation in his overall trade program.

Implications Beyond Trade Policy Consideration

The implications of Item 807.00 use extend far beyond purely domestic economic issues. Therefore, it would be most regrettable should the Commission's recommendations fail to reflect the views of all affected U.S. government agencies including, but not limited to, the Departments of State, Commerce, and Treasury; furthermore, the opinions of affected host nations and international organizations should be similarly solicited and made a part of the public record.

I. SUMMARY AND CONCLUSION

The Business Equipment Manufacturers Association, following a review of the use of Item 807.00 by the business equipment industry, finds this provision of the law, and assembly operations conducted thereunder, to be a positive factor in the existing vitality of this industry, including the well-being of its employees. We further believe that its repeal could have an

APPENDIX

MEMBER COMPANY ROSTER

Acme Visible Records, Inc.
Crozet, Virginia 22932

Addmaster Corporation
416 Junipero Serra Drive
San Gabriel, California 91776

Addressograph Multigraph
Corporation
1200 Babbitt Road
Cleveland, Ohio 44117

Addressograph Multigraph of Canada,
Ltd.
42 Hollinger Road
Toronto 16, Ontario, Canada

Adler Business Machines
Division of Litton Industries
355 Lexington Avenue
New York, New York 10017

R. C. Allen, Inc.
678 Front Street, N.W.
Grand Rapids, Michigan 49501

Allied Paper
Division of SCM Corporation
Kalamazoo, Michigan 49003

Alma Desk Company
Box 271
High Point, North Carolina 27261

American Automatic Typewriter
Co.
130 Cedar Street
New York, New York 10006

Ampex Corporation
Videofile Information Systems
Division
1020 Kifer Road
Sunny vale, California 94086

Art Metal
Division of Art Metal-Knoll
Corporation
Jamestown, New York 14701

Automated Business Systems
Division of Little Industries
600 Washington Avenue
Carlstadt, New Jersey 07072

BASF Systems, Inc.
Crosby Drive
Bedford, Massachusetts 07130

Bell & Howell Company
Business Equipment Group
6800 McCormick Road
Chicago, Illinois 60645

The Charles Bruning Company
Division of Addressograph
Multigraph Corporation
1800 West Central Road
Mount Prospect, Illinois 60056

The Buckeye Ribbon & Carbon
Company
Subsidiary of Addressograph
Multigraph Corporation
7209 St. Clair Avenue
Cleveland, Ohio 44103

Burroughs Corporation
Detroit, Michigan 48232

Burroughs Corporation
Business Forms & Supplies Group
Rochester, New York 14607

Burroughs Corporation
Defense, Space and Special
Systems Group
Paoli, Pennsylvania 19301

Cheshire, Inc.
Subsidiary of Xerox Corporation
408 Washington Boulevard
Mundelein, Illinois 60060

Clary Corporation
408 Junipero Serra Drive
San Gabriel, California 91776

Cole Steel Equipment Company
Division of Litton Industries
640 Whiteford Road
York, Pennsylvania 17405

Columbia Ribbon & Carbon
Manufacturing Co., Inc.
Glen Cove, New York 15542

Combined Paper Mills, Inc.
Subsidiary of the National
Cash Register Company
Combined Locks, Wisconsin 54113

Control Data Corporation
8100 - 34th Avenue South
Minneapolis, Minnesota 55440

Corry Jamestown Corporation
Subsidiary of the Singer Co.
Corry, Pennsylvania 16407

Cosco Business Furniture, Inc.
Gallatin, Tennessee 37066

Data Products Corporation
6219 DeSoto Avenue
Woodland Hills, California 91364

Core Memories, Inc.
2525 Charleston Road
Mountain View, California 94040

Stelma Telecommunications Division
17 Amelia Place
Stamford, Connecticut 06904

Card Equipment Division
8455 E. Prentice Avenue
Englewood, California 80110

Data Devices, Inc.
18666 Topham Street
Tarzana, California 91356

Dennison Manufacturing Company
300 Howard Street
Framingham, Massachusetts 01701

A. B. Dick Company
5700 West Touhy Avenue
Chicago, Illinois 60648

Dictaphone Corporation
Corporate Headquarters
Rye, New York 10580

Digitronics Corporation
1 Albertson Avenue
Albertson, New York 11507

Domore Office Furniture, Inc.
2400 Sterling Avenue
P. O. Box 1289
Elkhart, Indiana 46514

Eastman Kodak Company
Business Systems Market Division
343 State Street
Rochester, New York 14650

Thomas A. Edison Industries
McGraw-Edison Company
Voicewriter Division
51 Lakeside Avenue
West Orange, New Jersey 07051

Electronic Communications Incorporated
Subsidiary of the National Cash Register Company
1501 - 72nd Street, North
St. Petersburg, Florida 33733

Electronic Image Systems Corporation
Subsidiary of Addressograph Multigraph Corporation
Box 68, MIT Branch Post Office
Cambridge, Massachusetts 02139

Farrington Manufacturing Company
Electronics Drive
Springfield, Virginia 22151

Farrington Data Processing Ltd.
New Lane, Havant
Hampshire, England

Ford Industries, Inc.
5001 SE Johnson Creek Blvd.
Portland, Oregon 97206

Friden, Inc.
Division of Singer Co.
2350 Washington Avenue
San Leandro, California 94577

GAF Corporation
140 West 51st Street
New York, New York 10020

General Binding Corporation
1101 Skokie Boulevard
North brook, Illinois 60062

General Electric Company
Information Systems Group
570 Lexington Avenue
New York, New York 10022

The General Fireproofing Company
Youngstown, Ohio 44501

Gray Dictation Systems
Division of the Gray Manufacturing Co.
Randolph Industrial Park
Dover, New Jersey 07801

Gray Dictation Systems
16 East 40th Street
New York, New York 10016

The Gunlocke Company, Inc.
Subsidiary of the Sperry & Hutchison Co.
Wayland, New York

Harter Corporation
Box 400
Sturgis, Michigan 49091

Harter Metal Furniture Ltd.
Box 636
Guelph, Ontario, Canada

Honeywell, Inc.
Electronic Data Processing
Division
60 Walnut Street
Wellesley Hills, Massachusetts
02181

Intercontinental Systems, Inc.
Dura Division
2585 East Bayshore
Palo Alto, California 94303

International Business Machines
Corporation
Corporate Headquarters
Armonk, New York 10504

InterRoyal Corporation
1 Park Avenue
New York, New York 10016

ITEK Business Products
Division of ITEK Corporation
P. O. Box 1970
1001 Jefferson Road
Rochester, New York 14603

ITEK Business Products Limited
41 Brydon Drive
Rexdale, Ontario, Canada

JOFCO
13th & Vine Streets
Jasper, Indiana 47546

Kimball Systems
Division of Litton Industries
151 Cortlandt Street
Belleville, New Jersey 07109

Kleinschmidt Telecommunications
Division of SCM Corporation
Lake Cook Road
Deerfield, Illinois 60015

Knoll International
Division of Art Metal-Knoll
Corporation
320 Park Avenue
New York, New York 10022

Lehigh-Leopole Furniture Company
Division of Litton Industries
415 Madison Avenue
New York, New York 10017

Litton Industries, Inc.
Business Systems & Equipment
360 North Crescent Drive
Beverly Hills, California 90213

Litton Industries, Inc.
Office Communication Equipment
Group
850 Third Avenue
New York, New York 10022

Marble/Imperial Furniture Company
A Division of Dictaphone Corporation
89 Willis Street
Bedford, Ohio 44146

Marchant Electronics
SCM Corporation
6701 San Pablo Avenue
Oakland, California 94608

Marchant Operations
SCM Corporation
Orangeburg, South Carolina 29115

Microstatics Operations
SCM Corporation
P. O. Box 9
Libertyville, Illinois 60048

Micro Switch
Division of Honeywell, Inc.
Freeport, Illinois 61032

Herman Miller, Inc.
140 McKinley Street
Zeeland, Michigan 49464

Minnesota Mining & Mfg. Co.
Duplicating Products Division/
Microfilm Products Division
3M Center
St. Paul, Minnesota 55101

Monroe, Division of Litton
Industries
550 Central Avenue
Orange, New Jersey 07051

Moore Business Forms, Inc.
900 Buffalo Avenue
Niagara Falls, New York 14302

Mosler
Hamilton, Ohio 45012

Myrtle Desk Company
P. O. Box 1750
High Point, North Carolina 27261

The National Cash Register
Company
Dayton, Ohio 45409

Olivetti Underwood Corporation
One Park Avenue
New York, New York 10016

Pitney-Bowes, Inc.
Stamford, Connecticut 06904

RCA
Corporate Headquarters
30 Rockefeller Plaza
New York, New York 10020

Remington Office Equipment
Division of Sperry Rand
Corporation
1290 Avenue of the Americas
New York, New York 10019

Remington Rand Office Machines
Division of Sperry Rand Corporation
Executive Offices and Engineering
Center
333 Wilson Avenue
South Norwalk, Connecticut 06856

Jens Risom Design, Inc.
444 Madison Avenue
New York, New York 10022

Royal Typewriter Company
Division of Litton Industries
150 New Park Avenue
Hartford, Connecticut 06106

Roytype Supplies Division
Division of Litton Industries
1031 New Britain Avenue
West Hartford, Connecticut 06110

Saxon Business Products, Inc.
450 Seventh Avenue
New York, New York 10001

SCM Corporation
299 Park Avenue
New York, New York 10017

Sperry Rand Corporation
1290 Avenue of the Americas
New York, New York 10019

The Standard Register Company
P. O. Box 1167
Dayton, Ohio 45401

Steelcase, Incorporated
Grand Rapids, Michigan 49501

Stow/Davis Furniture Company
25 Summer Avenue, N.W.
Grand Rapids, Michigan 49502

Stromberg Datagraphix, Inc.
P. O. Box 2449
San Diego, California 92112

Sweda International - North America
Division of Litton Industries
550 Central Avenue
Orange, New Jersey 07051

Sylvania Information Systems
Division of Sylvania Electric Products, Inc.
2 Corporate Park Drive
White Plains, New York 10604

Tally Corporation
8301 South 180th Street
Kent, Washington, 98031

UARCO Incorporated
West County Line Road
Barrington, Illinois 60010

UNIVAC
Division of Sperry Rand Corporation
P. O. Box 8100
Philadelphia, Pennsylvania 19101

Varityper Corporation
Subsidiary of Addressograph Multigraph Corporation
11 Mt. Pleasant Avenue
Hanover, New Jersey 07936

Viatron Computer Systems Corporation
Route 62
Bedford, Massachusetts 01730

Victor Comptometer Corporation
3900 N. Rockwell Street
Chicago, Illinois 60618

VISIrecord
Division of Barry Wright Corporation
Copiague, Long Island, New York

Vista-Costa Mesa Furniture Company
Division of Dictaphone Corporation
Anaheim, California 92803

Wang Laboratories, Inc.
836 North Street
Tewksbury, Massachusetts 01606

Wright Line
Division of Barry Wright Corporation
160 Gold Star Boulevard
Worcester, Massachusetts 01606

Xerox Corporation
Stamford, Connecticut 06904

(Whereupon, at 1 p.m. the hearing was adjourned.)

APPENDIX

OMB POLICY CIRCULARS ON BULLETINS OUTSTANDING AS OF SEPTEMBER 10, 1971

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., August 6, 1966.

CIRCULAR NO. A–27, TRANSMITTAL MEMORANDUM NO. 1

To the heads of executive departments and establishments.

Subject: Change in responsibility for the Computer Sharing Exchange—Washington, D.C.

1. *Purpose*

This Transmittal Memorandum announces the assumption of responsibility for the Computer Sharing Exchange, initially established and operated by the Department of Commerce at the National Bureau of Standards, Washington, D.C., by the General Services Administration. The General Services Administration is now enabled to carry out its responsibilities, in respect to the ADP sharing program, on a nationwide basis.

2. *Revised instructions*

a. Paragraph 5(a)(1) of the circular is revised to read:

(1) Arrange for the establishment and operation of computer sharing exchanges or equivalent arrangements throughout the country where electronic computers and a concentration of agencies exist as to indicate such establishment would provide effective services to agencies.

b. Paragraph 5(a)(2) of the circular is revised to read:

(2) Cooperate with the Computer Service Center established experimentally by the Department of Commerce at the National Bureau of Standards.

CHARLES L. SCHULTZE, *Director.*

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

June 15, 1964 CIRCULAR NO. A-27

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Policies and responsibilities on the sharing of electronic computer time and services in the executive branch

1. Purpose. This Circular announces policies and responsibilities in respect to (a) the sharing of electronic computer time and related services within and among agencies in the executive branch, and (b) the assistance available to agencies in locating appropriate computer resources to perform essential work.

2. Definitions.

a. Sharing. Generally, computer sharing is defined as "computer work" performed for an organization that is not an organic part of the organization operating the computer (non-mission type work) and where the providing organization is not normally responsible for or funded and staffed to produce the work.

b. Computer work. Computer work is defined as including projects which require computer use and computer associated services (e.g., main frame; and key punching, punched card equipment, transceivers, and auxiliary equipment time, if such is directly related to a computer process), and personal services associated with the processes.

3. Background. As a part of the automatic data processing (ADP) program, various means have been pursued to increase the utilization of electronic computers in the executive branch. It has been found that the utilization of available computer capacity of an agency, by other organizations of that agency or by other agencies, results in the use of time which otherwise would remain open and thus provides mutual benefits to individual agencies and the Government as a whole.

An experimental project, to promote and facilitate voluntary sharing among agencies, has recently been concluded in the Philadelphia, Pennsylvania area. A Computer Sharing Exchange was established in that area as a focal point of information and advice on sharing possibilities. An evaluation of the experiment reveals that the concept of sharing should be encouraged and extended throughout the executive branch.

Apart from the Philadelphia effort, the Department of Commerce has established a Computer Sharing Exchange and an experimental Computer Service Center at the National Bureau of Standards, Washington, D.C. to serve agencies in that area.

4. Policies.

a. The practice of offering available electronic computer time and related services for use within and among agencies of the Federal Government is to be followed as a means of increasing the utilization of equipment.

b. The use of sharing is to be considered by departments and establishments and their field offices as a principal means to perform essential computer work for which electronic computer resources are not at hand in the organization.

c. Agencies are encouraged and are expected to utilize the referral services provided by Computer Sharing Exchanges or equivalent services as may be established to identify sources of assistance available for sharing purposes.

d. Negotiations, arrangements, and agreements for sharing are the responsibilities of the participating agencies.

e. Normally, reimbursement is made for sharing services except where the cost is nominal or where reimbursement may not be practicable. Sharing services provided to other Federal Government agencies may be paid for as authorized by those provisions of law set forth in 31 U.S. Code 686 or other similar applicable statutes.

5. Responsibilities.

a. The General Services Administration will carry out the following responsibilities -

(1) arrange for the establishment and operation of computer sharing exchanges or equivalent arrangements in other metropolitan areas of the United States, outside the Washington, D.C. metropolitan area, where electronic computers and a concentration of agencies exist as to indicate such establishment would provide effective service to agencies.

(2) cooperate with the Computer Sharing Exchange and the Computer Service Center established experimentally by the Department of Commerce at the National Bureau of Standards.

(3) establish liaison between and among Computer Sharing Exchanges and with Federal Executive Boards to gain the benefits of assistance and promotion the Boards can provide.

(4) conduct or arrange for such activities as will contribute to the furtherance of sharing within and among agencies.

(5) identify deterrents to sharing and develop means to overcome them.

(6) acquire and maintain the data necessary to record sharing arrangements on a nationwide basis; analyze such data for identification of volume, types of service, monetary values, trends, and other pertinent information, and provide essential reports.

b. Each executive department and establishment is responsible for establishing policies and procedures to encourage and facilitate maximum participation in computer sharing by their departmental and field establishments.

KERMIT GORDON
Director

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

October 14, 1961 **CIRCULAR NO. A-54**

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Policies on selection and acquisition of automatic data processing (ADP) equipment

1. Purpose. This Circular prescribes policies on (a) making selections of equipment to be acquired for use in the automatic data processing (ADP) program of the executive branch, and (b) making determinations as to whether the ADP equipment to be acquired will be leased, purchased, or leased with an option to purchase.

2. Scope. The ADP equipment affected by the policies stated herein includes:

- a. Electronic digital computers, irrespective of use, size, capacity, or price;
- b. All peripheral or auxiliary equipment used in support of electronic computers, whether or not cable-connected and whether selected and acquired with the computer or separately;
- c. Punched-card equipment, whether used in conjunction with or independent of an electronic computer; and
- d. Data transmission or communications equipment that is selected and acquired solely or primarily for use with a configuration of ADP equipment which includes an electronic computer.

Analog computers are covered only when computers of this type are being used as equipment peripheral to a digital computer.

Items of ADP equipment that are (a) physically incorporated in a weapon, or (b) manufactured for the Government under a developmental contract, are not affected by the policies stated herein.

3. Applicability. The policies herein apply to ADP equipment acquired by the Government and to that ADP equipment which is acquired and operated by Government contractors solely to process Government data at Government expense (e.g., Government-owned, contractor-operated facilities). These policies do not apply to ADP equipment acquired by universities and similar institutions with financial assistance through grants-in-aid of Government funds.

The policy provisions of this Circular become applicable when a determination has been made that the utilization of ADP equipment is essential. It is assumed that such determinations have been preceded by and are based upon the results of well-documented studies which provide an adequate factual basis for concluding (a) that the functions or processes for which the ADP equipment can be used are essential to perform, and (b) that the systems, procedures, and methods to be employed in performing these functions or processes have been designed to achieve the highest practicable degree of effectiveness with optimum efficiency and operational economy. Guidelines for planning and conducting studies preceding a decision to utilize ADP equipment, for the development of system specifications, and for equipment evaluation and selection are contained in Bureau of the Budget Bulletin No. 60-6, "Automatic Data Processing (ADP) Program of the Executive Branch: Studies preceding the acquisition of ADP equipment," dated March 18, 1960.

4. Policies on equipment selection. The selection of ADP equipment includes the initial selection of ADP equipment, the selection of ADP equipment additional to that on hand, the selection of ADP equipment to replace ADP equipment on hand, the modification of equipment on hand, usually for the purpose of increasing memory capacity, computational capability, or speed of input or output, or combinations of the foregoing. In all these circumstances, the following policies apply:

a. The selection of ADP equipment will not be made until system specifications are available to serve as a basis for selection. For purposes of this Circular, the term "system specifications" means (1) the delineation of the objectives which the system is intended to accomplish; (2) the data processing requirements underlying that accomplishment, i.e., a description of the data output and its intended uses, the data input, data files, volumes of data, processing frequencies and timing; and (3) such ADP equipment capabilities as may need to be identified. System specifications will be designed to insure free competition among equipment manufacturers.

b. The officials responsible for making decisions on the selection of ADP equipment will assure that the selection process accords equal opportunity and appropriate consideration to all manufacturers who offer equipment capable of meeting the system specifications. In this connection, the selection process may be facilitated by written invitations to manufacturers to submit proposals as a means for obtaining information regarding the capabilities of ADP equipment to meet the system specifications.

c. Two prime factors will be considered in the selection of equipment: (1) its capability to fulfill the system specifications, and (2) its overall costs, in terms of acquisition, preparation for use, and operation. The term overall costs, as used in this paragraph, will be interpreted to include such cost elements as personnel, purchase price or rentals, maintenance of purchased equipment, site preparation and installation, programming and training. When ADP equipment of two or more manufacturers meets the system specifications, the equipment which represents the least overall cost to the Government will be selected. Factors which do not relate directly or indirectly to the capability of ADP equipment to meet system specifications or overall costs normally will not be included in the considerations unless a conclusive judgment cannot be made on the basis of the two prime factors.

5. Policies on equipment acquisition. Most commercially available ADP equipment can be acquired by purchase or by lease, with or without an option to purchase. The General Services Administration has contracts with principal manufacturers, listed in Federal Supply Schedules (FSS), for the rental of ADP equipment. GSA currently is negotiating contracts for the purchase (including provisions for trade-in allowances) and maintenance of ADP equipment. Until such time as these contracts appear on the Federal Supply Schedule, it will be necessary for departments and agencies to negotiate purchase and maintenance transactions. All ADP equipment acquisition transactions are subject to prevailing policies, laws and regulations governing procurement by Federal Government agencies. In addition, except for equipment that can be acquired by the purchase method only, the following policies are applicable:

a. The method of acquiring ADP equipment will be determined after careful consideration of the relative merits of all methods available (i.e., purchase, lease, or lease-with-option-to-purchase). The method chosen will be that which offers the greatest advantage to the Government under the circumstances which pertain to each situation. In this connection, the following general guidelines will be taken into account:

(1) The purchase method is preferred when all of the following conditions [illegible]:

(a) The system study which preceded the selection of the equipment has established a reasonable expectancy that the ADP equipment under consideration can be successfully and advantageously used.

(b) A comparative cost analysis of the alternative methods of acquisition, of the types illustrated by Attachments A and B, indicates that a cost advantage can be obtained by the purchase method in six years or less after the date of delivery. This analysis usually will include the following cost elements under each method: for the lease method--rental costs, including maintenance; for the purchase method--purchase costs, including purchase price, maintenance, and other one-time costs applicable only to purchase; for the lease-with-option-to-purchase method--rental costs, and purchase costs less credits applicable upon purchase. In addition to the cost elements described above, the residual value of equipment to the Federal Government will be considered as a factor in a comparative cost analysis. Trade-in allowances quoted by manufacturers may be used as a representation of the residual value.

(c) The capabilities of the ADP equipment will continue to be needed and will be sufficient to satisfy the system requirements, current and projected, for a period beyond the point in time at which the purchase method begins to provide a cost advantage. The possibility that future technological advances will render the selected equipment comparatively obsolete before the cost advantage point is reached should not rule out purchase if the selected equipment is expected to be able to satisfy the system requirements.

(2) The lease-with-option-to-purchase method is indicated when it is necessary or advantageous to proceed with the acquisition of the equipment that meets system specifications, but it is desirable to defer temporarily a decision on purchase because circumstances do not fully satisfy the conditions which would indicate purchase. This situation might arise when it is determined that a short period of operational experience is desirable to prove the validity of a system design on which there is no previous experience, or where decisions which might substantially alter the system specifications are imminent.

(3) The lease method, without option to purchase, is indicated only when it is necessary or advantageous to proceed with the acquisition of equipment that meets system specifications and it has been established conclusively that any one of the conditions under which purchase is indicated is not attainable.

b. Negotiations or renegotiations of equipment delivery dates will be conducted in a manner which insures that firm and final commitments by the Government to accept delivery of ADP equipment on a specific date will not be made until it has been determined through a readiness review that the using agency will be prepared to use the equipment productively as soon as it becomes operational

6. Review of current or pending lease transactions.

a. Lease or lease-with-purchase-option transactions in effect at the time this Circular is issued, and which are expected to remain in effect until fiscal year 1964, will be reviewed in the light of the provisions of paragraph 5. If it is found to be to the advantage of the Government to purchase leased ADP equipment in this category, steps will be taken to make such purchases during the earliest fiscal year in which funds for this purpose are available to the agency. Reviews of current lease transactions should be undertaken as soon as practicable and completed by June 30, 1962.

b. The method of acquisition of ADP equipment selected but not yet accepted for delivery at the time this Circular is issued will be reviewed for adherence to the policies herein stated, and, when indicated, the basis of acquisition will be changed to conform if permitted by the terms of the contract or agreement.

7. Documentation. System studies (sometimes referred to as applications studies, feasibility studies, and by other terms), system specifications, and readiness reviews will be fully documented. Decisions on the selection of ADP equipment, on the method of acquisition, and on the review of the current status of the method of acquisition also will be documented to reflect adequately the considerations taken into account and the basis for the decisions.

8. Administration of policies. The head of each executive department and establishment will establish the necessary framework of procedures, including appropriate reviews and controls, that will assure compliance with the policies herein stated.

By direction of the President:

DAVID E. BELL
Director

Attachments 2

ATTACHMENT A
CIRCULAR NO. A-54

LEASE VS. PURCHASE
REPRESENTATIVE ADP COMPUTER SYSTEM
BASED ON TWO-SHIFT USE

ITEM OF COST	COSTS BY FISCAL YEAR					
	1962*	1963	1964	1965	1966	1967
1. Purchase basis:	$	$	$	$	$	$
a. Purchase costs.	600,000	0	0	0	0	0
b. Maintenance, cumulative.	45,000	90,000	135,000	190,000	245,000	300,000
c. Cumulative, purchase basis.	645,000	690,000	735,000	790,000	845,000	900,000
2. Lease basis, cumulative (including maintenance).	200,000	400,000	600,000	800,000	1,000,000	1,200,000
3. Purchase basis exceeds lease basis.	445,000	290,000	135,000	--	--	--
4. Lease basis exceeds purchase basis.	--	--	--	10,000	145,000	300,000

* Year acquired, utilized full year.

ATTACHMENT B
CIRCULAR NO. A-54

LEASE VS. LEASE-WITH-OPTION-TO-PURCHASE REPRESENTATIVE ADP COMPUTER SYSTEM BASED ON ONE-SHIFT USE

ITEM OF COST	COSTS BY FISCAL YEAR					
	1962*	1963	1964	1965	1966	1967
1. Lease basis, with-option-to-purchase: (Option exercised at end of first year).	$	$	$	$	$	$
a. Lease.	150,000	--	--	--	--	--
b. Less, credit upon purchase.	-75,000	--	--	--	--	--
c. Purchase costs.	600,000	0	0	0	0	0
d. Maintenance, cumulative.	26,000	52,000	78,000	108,000	138,000	168,000
e. Cumulative, lease/option basis.	701,000	727,000	753,000	783,000	813,000	843,000
2. Lease basis, cumulative (including maintenance).	150,000	300,000	450,000	600,000	750,000	900,000
3. Lease/option exceeds lease basis.	551,000	427,000	303,000	183,000	63,000	--
4. Lease basis exceeds lease/option basis.	--	--	--	--	--	57,000

* Year acquired, utilized full year.

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

June 27, 1967

CIRCULAR NO. A-54
Revised
Transmittal Memorandum No. 1

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Policies on selection and acquisition of automatic data processing equipment

1. Purpose. This Transmittal Memorandum No. 1 provides interim modifications to Circular No. A-54 pending the issuance of a revised Circular.

2. Modifications.

a. Paragraph 3, Applicability. Change paragraph 3 to read as follows:

"a. The policies herein apply to agencies of the Federal Government and to Government contractors (including educational institutions and other not-for-profit organizations) who operate ADP equipment in the performance of work under cost-reimbursement-type contracts or subcontracts when (1) the equipment is leased and the total cost of leasing is to be reimbursed under one or more cost-reimbursement-type contracts, (2) the equipment is purchased by the contractor for the account of the Government or title will pass to the Government, (3) the equipment is furnished to the contractor by the Government, or (4) the equipment is installed in Government-owned, contractor-operated facilities.

"b. The policy provisions of this Circular become applicable when a determination has been made that the utilization of ADP equipment is essential. It is assumed that such determinations have been preceded by and are based upon the results of well-documented studies which provide an adequate factual basis for concluding (1) that the functions or processes for which the ADP equipment can be used are essential to perform, and (2) that the systems, procedures, and methods to be employed in performing these functions or processes have been designed to achieve the highest practicable degree of effectiveness with optimum efficiency and operational economy. Guidelines for planning and conducting studies preceding a decision to utilize ADP equipment, for the development of system specifications, and for equipment evaluation and selection were contained in Bureau of the Budget Bulletin No. 60-6, Automatic Data Processing (ADP) Program of the Executive Branch: Studies preceding the acquisition of ADP equipment, dated March 18, 1960.

"c. A decision to initiate the process of selecting and acquiring ADP equipment, or acquiring ADP services which supplement the capacity of installed equipment, from commercial sources will not be made unless it is first determined that the required ADP capability cannot be met satisfactorily either by sharing ADP equipment already installed or by utilizing excess leased or Government-owned ADP equipment, as provided by Federal Property Management Regulations. The reasons for any such determinations will be adequately documented."

b. Paragraph 5, Policies on equipment acquisition. Make the following changes in paragraph 5:

(1) Change the introduction to read as follows:

"Most commercially available ADP equipment can be acquired by purchase or lease from equipment manufacturers, or by lease from commercial leasing firms. Lease arrangements can usually include a purchase option. The General Services Administration currently has Federal Supply Schedule contracts with equipment manufacturers for the purchase, lease and maintenance of ADP equipment. Lease arrangements under these contracts all contain a purchase option. The Contractors' Authorized Price Lists issued pursuant to these Schedules contain the terms, conditions and prices which are applicable to all purchase orders issued by Federal agencies under the Schedules. However, it will usually be necessary for Federal agencies to define these terms and conditions with more precision in the purchase orders in order to assure that any specific requirements are covered. In particular, agencies will assure that the terms and conditions for each procurement are clear with respect to the required delivery dates of both hardware and software to provide an operational system, and the attainment of total performance at a rate and cost consistent with that upon which the selection of equipment was predicated. Similar assurances should also be sought in authorized procurement actions which do not make use of Federal Supply Schedule contracts. The General Services Administration will assist agencies in negotiating requirements with equipment manufacturers, commercial leasing firms and other suppliers. The determination of whether ADP equipment should be purchased or leased will be governed by the following policies:"

(2) Add the following sentences to the end of paragraph 5 a(1)(b):

"Also considered as a factor in the comparative cost analysis will be the cost of money (i.e., interest) which will be added to the capital invested in the purchase of the equipment. Interest will not be applied to lease and maintenance costs. In making the computation for the interest cost in each year, it will be assumed that the capital investment will be reduced at the end of each year on a straight-line basis over the estimated period of equipment use. The interest rate used will be the current average market yield, rounded to the nearest one-eighth of one percen on outstanding Treasury marketable obligations with approximately 5 years remaining to maturity at the time the purchase/lease decision is made; this is obtainable from the Office of the Fiscal Assistant Secretary of the Treasury Department (184-5458). The factors discussed herein will be included in the comparative cost analysis as additions to the items illustrated on Attachments A and B. Other economic analysis techniques are permissible if they are consistent with agency policies and practices regarding purchase/lease decisions in general."

(3) Add the following as a new paragraph 5 c:

"c. Any equipment displaced by new acquisitions, or because it is no longer required for the purposes for which it was being used, will be made available for redistribution as excess property in accordance with Federal Property Management Regulations and will not be retained for other uses unless fully justified in accordance with agency approval procedures. Such justification will be carefully developed and evaluated, taking into account the program and cost benefits to be derived by the new uses of the equipment, the cost of operating and maintaining the displaced equipment and, alternatively, the cost of acquiring and operating other equipment in lieu of the displaced equipment to serve the same purposes."

CHARLES L. SCHULTZE
Director

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

January 7, 1969

CIRCULAR NO. A-54
Revised
Transmittal Memorandum No. 2

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Policies on selection and acquisition of automatic data processing (ADP) equipment

1. Purpose. This Transmittal Memorandum amends Circular No. A-54 pending the issuance of a revised Circular.

2. Amendments.

a. Under 5a(1), a new paragraph is added:

"(d) The feasibility and economics of performing maintenance of equipment with in-house resources has been considered. This consideration should be consistent with the provisions of Bureau of the Budget Circular A-76, Revised, dated August 30, 1967, "Policies for acquiring commercial or industrial products and services for Government use." In each case, the variable elements of cost to have the services performed under contract (costs for on-site and on-call maintenance service required) should be weighted against the variable elements of cost to perform the maintenance in-house (personnel cost, spare parts and test equipment, establishment of and continuation of a program for training, and other indirect costs). Costs such as providing working space for the maintenance personnel and a storeroom for spare parts, are generally comparable under either type maintenance arrangement and consequently, for comparison purposes, can be excluded. Some of the additional factors that should be considered before making an in-house maintenance decision are the (1) operational character of systems, (2) location of equipment, (3) split maintenance responsibility, (4) quality of maintenance and modification by equipment manufacturers, (5) size of computer installation, and (6) experience requirements and training for maintenance personnel. The General Services Administration has under way a detailed study of the alternative methods of acquiring maintenance, the cost considerations and other factors involved and will later issue more specific guidelines to assist agencies in arriving at maintenance decisions."

b. Replace paragraph 6 with the following:

"6. Review of leased and Government-owned equipment.

a. Equipment acquired under lease should be reviewed when there has been, or there may be, a substantial change in the circumstances which were germane to the initial decision. Frequently, there are changes in the projected life of the application system, or in terms or prices of the Federal Supply Schedule, or in workload volumes, etc., which alter the balance between lease versus purchase costs. To the extent feasible, these reviews should be made so as to coincide with the submissions of the agencies' annual budget requests, so that, if purchase is indicated and funds are not available, requests for appropriations may be made at the earliest possible date.

b. On occasion, special opportunities arise to purchase equipment at prices considerably lower than those specified in the Federal Supply Schedule but with time limitations which do not allow for securing the necessary funds under normal budgetary procedures. When such opportunities arise, a review of the lease/purchase factors should again be made and if purchase appears desirable, efforts to secure the necessary funds should be made by (1) reprogramming or, failing in this, (2) requesting GSA to consider the purchase under the ADP Revolving Fund.

c. The method of maintaining Government-owned equipment should be periodically reviewed, preferably annually, so that consideration is given to the feasibility and economics of performing maintenance with in-house resources. The guidance contained in paragraph 5a(1)(d) is applicable for purposes of this review."

CHARLES J. ZWICK
Director

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

August 26, 1971

CIRCULAR NO. A-54
Transmittal Memorandum No. 3

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Policies on selection and acquisition of automatic data processing equipment

1. Purpose. This Transmittal Memorandum No. 3 amends Circular No. A-54 to provide additional policy guidance relating to the replacement of ADP equipment.

2. Amendment. Add the following subparagraph d to paragraph 4:

"d. The selection of new ADP equipment to replace and upgrade equipment on hand is frequently possible within the same or a new product line of the vendor supplying the existing equipment. Usually such new equipment is compatible with existing equipment, and offers a better cost-performance ratio than is currently being achieved. These replacement possibilities, often advanced by unsolicited proposals, generally appear attractive on the surface. However, several factors should be evaluated before making a decision to proceed with the replacement. These include:

(1) If the replacement is to be made without a competitive evaluation, it is in effect a sole-source procurement and is subject to the Federal Procurement Regulations and Federal Property Management Regulations governing sole-source procurements.

(2) If the replacement is being contemplated to relieve a situation in which the work load is causing a saturation of existing facilities, other actions should also be considered. They are: (a) revalidate the work load and data processing requirements to determine if a reduction can be effected, and (b) determine the possibility of improving the performance of existing facilities through program modifications, rescheduling or the selective replacement of software or peripheral devices which offer greater efficiency or lower cost. For this latter action, techniques are available to assist in evaluating the performance of existing operations and identifying possible

areas of improvement. By making such improvements, it may be possible to streamline the current process to a degree equaling or exceeding that achieved through complete replacement of the equipment.

(3) The use of alternative commercial sources of supply (such as leasing companies), or alternative methods of contracting for the existing equipment (such as the purchase of leased equipment), might result in equally significant cost/benefit improvements. Policies governing alternative acquisition methods are contained in paragraph 5 of this Circular.

The mere availability of equipment within the existing vendor's product line which is compatible with the installed equipment and which may offer a better cost/performance ratio is not, therefore, a sufficient basis for deviating from the provisions of subparagraphs 4a, 4b, and 4c of this Circular. The policy objectives of defining system specifications as the basis for selection so as to encourage free competition, of according equal opportunity to all qualified suppliers, and of making the selection on the basis of capability and overall cost apply in these cases as they do in the initial selection of equipment. The General Services Administration can advise agencies in determining and evaluating alternative procurement possibilities and methods. Decisions reached in this regard will be properly documented as required by paragraph 7, including a statement of the anticipated cost/benefit improvements against which actual results can be analyzed."

GEORGE P. SHULTZ
DIRECTOR

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

August 3, 1963

CIRCULAR NO. A-61

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Guidelines for Appraising Agency Practices in the Management of Automatic Data Processing (ADP) Equipment in Federal Agencies

1. Purpose. This Circular transmits a copy of a document titled "Guidelines for Appraising Agency Practices in the Management of Automatic Data Processing (ADP) Equipment in Federal Agencies."

2. Background. The attached document deals on a broad basis with the principal considerations that apply in appraising agency practices in the management and use of automatic data processing equipment. It was prepared by the Bureau of the Budget for internal use and is now being distributed to the agencies to indicate the kinds of considerations the Bureau of the Budget may apply during the various review processes, and more importantly to serve as a guide for agency self-appraisal.

3. Use of the guidelines. These guidelines are intended to highlight areas of consideration which are the special concern of persons having broad management or review responsibilities. Consequently the coverage is selective. In this connection, the Foreword will be of particular significance to agency heads and their principal assistants.

The discussion of each topic is presented in summary fashion to stimulate consideration of the subject and provide a base for further inquiry or exploration as may be warranted. The guidelines reflect the application of principles and practices which on the basis of experience have come to be generally accepted as prudent and proper. Although these guidelines have wide applicability, it should be recognized that there may be occasion for modification or deviation where special circumstances justify such action in protecting the Government's interests.

KERMIT GORDON
Director

Attachment

GUIDELINES
FOR APPRAISING AGENCY PRACTICES
IN THE MANAGEMENT OF AUTOMATIC DATA PROCESSING (ADP) EQUIPMENT
IN FEDERAL AGENCIES

For Use By
Budget Examiners and Other Professional Staff
in the Bureau of the Budget

Revised July 1963

Office of Management and Organization
Bureau of the Budget

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FOREWORD

It has been well demonstrated that automatic data processing (ADP) equipment can be utilized advantageously by the Government to bring about improvements in the major work programs for which the executive branch is responsible, ranging from administrative and business-type tasks to complex scientific, military-tactical and engineering programs. Moreover, with the aid of this equipment, notable progress is being made in the management sciences, since many techniques such as operations research and advanced statistical or mathematical routines are now usable on a wider front and in a far more meaningful fashion than was possible before the era of the computer.

But while instances of encouraging results in utilizing ADP equipment are today numerous in the Government, we have yet to exploit this equipment to its full potential. On the whole, we have made good use of it in achieving greater efficiency in the data processing systems which were in use before the advent of the computer. This is a good beginning; but it provides only the basic groundwork for the next logical step, i.e., to introduce into our data systems more of the new and improved techniques that computers make possible. Thus, while we should not discount the advancements we have made in ADP equipment utilization during the past decade, we nevertheless should direct our future planning toward exploitation of the further and greater potential of this equipment, much of which at this time remains untapped.

An assessment of experience in the use of ADP equipment over the past several years has made it possible to develop a set of guidelines for use throughout the Bureau of the Budget in appraising agency practices in their management and use of ADP equipment. The applicability of the guidelines will vary according to circumstance. They were prepared for year-round use, not solely for budget hearings. They are by no means exhaustive but they are deemed to be sufficient to initiate avenues of inquiry into all major aspects or certain selected aspects of ADP equipment management. Once initiated, these inquiries may result in further explorations to the depth necessary to obtain the facts needed in a given situation.

In summary, an appraisal of agency practices will include a determination that:

1. Major decisions involving the use of ADP equipment receive the active consideration of agency top management.

2. There is provision for centralized direction and coordination of agencywide ADP activities.

3. Decisions to acquire ADP equipment are based upon (a) proper justification resulting from an adequate system study, including system specifications, and (b) consideration of interagency or intra-agency equipment sharing possibilities.

4. Whenever feasible, system designs exploit the unique features which computer capabilities make possible, such as operations research and systems integration.

5. Selections of ADP equipment are made within the framework of system specifications; equal opportunity is afforded all eligible equipment suppliers; and, from the standpoint of performance and cost, selection decisions are in the best interests of the Government.

6. All sources and methods of ADP equipment acquisition are considered and the chosen course of action provides the greatest advantage to the Government.

7. ADP equipment utilization throughout the agency is continuously under scrutiny with the objective of improving utilization at every practicable opportunity.

The Management Improvement and Research Branch, Office of Management and Organization, is available to provide assistance to other professional staff of the Bureau, as needed and requested, in elaborating upon the guidelines herein provided and in suggesting avenues of inquiry for use in evaluating ADP utilization practices in individual situations.

A. THE AGENCY ADP PROGRAM

1. Need and purpose of central authority. When several constituent units within an agency use or plan to use ADP, it is believed desirable to establish a central authority at the agency level, as some agencies have done, to coordinate the agencywide data processing program. The primary functions to be performed, in behalf of the head of the agency, ordinarily would be to:

a. Assure that the data processing programs of the constituent units are in accord with and oriented toward agency plans and objectives and to assure their conformance to policy guidelines issued by the agency, the Bureau of the Budget and other external organizations.

b. Provide a stimulus to systems planning which transcends organizational lines within the agency as well as that which permits integration with systems of other agencies.

c. Establish priorities of systems planning effort when dictated by limited resources of time, talent, and funds within the agency.

d. Foster and coordinate the time-sharing of equipment.

2. The organizational placement of a central ADP authority currently varies among agencies that have established an authority of this type. Wherever placed, the nature of its function requires that it be in a position where it can provide effective direction of the agencywide program and, in so doing, assure that the requirements, interests, and views of all constituent units are appropriately and objectively considered. As a general rule, this can best be accomplished in an organization characterized as a high-level policy, planning or management organization rather than an operating or ADP-user organization.

3. Elements of the agency program. The central authority should formulate an agency data processing program which includes consideration of the following elements:

a. A formal agency statement embracing ADP objectives and motivations; governing policies; and a delineation of the respective responsibilities of the central authority and the constituent units.

b. Provision for adequate recognition of the following order of events in what might be termed the "Data Processing Management Cycle" (illustrated in Attachment A), including the provision of appropriate guidelines and techniques:

(1) Data Processing Inventory: An identification of all major data processing areas in an agency for the purpose of (a) selecting and focusing upon those in which the use of ADP techniques appears to be potentially advantageous, (b) establishing relative priorities and schedules for embarking on ADP studies, and (c) identifying significant relationships among areas to pinpoint possibilities for the integration of systems.

(2) Probability Study: A relatively broad-gauged study of one or more of the areas identified in the Data Processing Inventory to determine whether it is sufficiently probable that effective use of ADP equipment can be made to warrant the substantial investment of people, time, and money in a more detailed system study.

(3) System Study: A detailed study to determine whether, to what extent, and how ADP equipment should be used. It usually includes an analysis of the existing system and the design of the new system, including the development of system specifications which provide a basis for the selection of equipment.

(4) Equipment Selection: The process of deciding upon the model and the configuration of equipment to be used in a system.

(5) Equipment Acquisition: The process of deciding whether the equipment should be purchased, leased, leased with an option to purchase, or acquired by transfer.

(6) Readiness Measures and Reviews: The measures taken to prepare for the installation and operation of the ADP equipment, including recruiting, training, programming, preparing written procedures, data conversion, and site preparation. One aspect of this phase is a formalized review, about 1 to 3 months before the equipment is installed, of the readiness measures taken to insure that sufficient preparation has been made for productive use of the equipment immediately after its acceptance.

(7) System Operation: The administration and operation of an ADP equipment-oriented system, including staffing, scheduling, equipment and service contract administration, equipment utilization practices and time-sharing.

(8) System Evaluation: A periodic evaluation of the system to assess its status in terms of original and/or current expectations and to chart its future direction.

c. Provision for maintaining information on ADP plans and practices for managerial purposes including, as a minimum, the information required to be transmitted annually on March 31 to the Bureau of the Budget. (See Bureau of the Budget Circular A-55)

d. Provision for adequate training of persons engaged in system studies, programming, equipment operation and related functions.

e. Provision for minimizing the adverse effects upon personnel whose jobs are eliminated or changed by the use of ADP, including proper communication with employees regarding plans for ADP systems and provision for retraining and reassignment.

f. Provision for effective plans which would minimize the adverse impacts of prolonged equipment malfunction or common disasters.

g. Provision for appropriate representation on the Interagency Committee on Automatic Data Processing--a Committee sponsored by the Bureau of the Budget on which all agencies are entitled to membership.

B. THE DECISION TO USE ADP EQUIPMENT

1. The system study: a prerequisite to decisions on use. A decision on whether or not to install ADP equipment should be based upon a documented system study which sets forth those considerations essential to a sound judgment on the question. This basic premise is emphasized in Bureau of the Budget Circular A-54, dealing with the selection and acquisition of ADP equipment. Bureau of the Budget Bulletin No. 60-6 provides general guidelines on the organization, conduct, scope, and content of such studies. The value of adequately documenting the study is to (a) assure that a proper study has been made, (b) afford an opportunity for reviewing levels to evaluate the recommendations and resulting decisions, and (c) provide a benchmark for the future evaluation of the system in terms of the original expectations. Even though the study may conclude that ADP equipment is not appropriate, the value of a study is not lost because often the possibility of extensive improvements to the existing system, short of ADP, will become evident.

2. The aspects of the documented system study which are most likely to be of primary concern to the budget examiner are:

a. The purpose and objectives of the function which the system is intended to serve. This aspect of the study is intended to assure that the proposed system is geared to a current and valid statement of the function and the objectives which it serves. A critical examination of the function, as a preliminary step, may disclose the fact that the function no longer is responsive to a current or projected need and therefore needs to be re-oriented (or perhaps eliminated). Such a re-orientation may, in turn, influence the characteristics of the system by which the function is carried out.

b. The justification for adopting the system. Underlying the question of whether the proposed data processing system is justified is the more basic question of whether the uses of ADP equipment which are being proposed are the most potentially fruitful or significant applications that can be made. There is little justification for applying ADP resources to a system which is already functioning satisfactorily, merely for the sake of achieving marginal benefits, when those same resources might better be applied to systems where the potentials for improvement are much more significant. This consideration is not fundamentally an ADP issue. It is a management issue related to the establishment of priorities in terms of need and the application of resources. Assuming that appropriate recognition has been given to this issue, then the justification for the specific ADP proposal revolves around two basic considerations, one balanced against the other:

(1) The comparative advantages or benefits of the proposed system vs. the existing system. The relative advantages and/or disadvantages expected from the proposed system should be identified. They should be stated with as much precision as possible, and, to the extent practicable, should describe how they will contribute to the more effective accomplishment of program objectives. This element of the study guards against a recurrence of past experience wherein systems using ADP equipment were installed (sometimes at greater cost) on the basis of generalized expectations (such as better information, more data, faster processing)without a penetrating analysis of why these features were needed and how they would influence the more effective accomplishment of the program objectives.

(2) The comparative costs of the proposed system vs. the existing system. This analysis should consider all aspects of the system, including not only the cost of operating the ADP equipment but also the costs of the functions and organizations which it serves. Its purpose is to provide a basis for determining whether the benefits to be obtained from the new system are worth the costs involved. The analysis should identify separately the new costs to be created by the proposed system; and the existing costs to be reduced, eliminated, or increased under the proposed system. To the extent feasible, dollar values should be assigned to each of the improvements expected under the proposed system so as to arrive at a reasonable and proper cost/benefit relationship. They may be of prime importance in those cases (becoming more frequent) where justification is based on improved management rather than decreased data processing costs, but should be critically reviewed to assure their reasonableness and validity.

Experience has indicated a strong tendency to under-estimate the costs involved in the use of ADP equipment, primarily because of the failure to consider some of the major elements of cost. Very often, comparative cost analyses are confined to or presume a fully implemented system and ignore the substantial costs incurred in preparing for the system. The principal elements of cost that may be involved both in preparing for and operating the computer are:

(a) Preparation (initial) costs.

(1) The analysis and the design of the details of the system, including development of the procedural manuals.

(2) Preparation of the site for the ADP equipment, which may range from $20,000 - $150,000 or more.

(3) Conversion of basic data into a form suitable for use with ADP equipment, often a costly process.

(4) Training of personnel.

(5) Programming and testing of computer instructions.

(6) Parallel operations, i.e., dual operation of both the old and new systems for a period of time as a precaution against potential difficulties arising during the initial operation of the new system.

(7) Purchase of ADP equipment, magnetic tape reels, punched cards, and other supplies.

(b) Operating (continuing) costs.

(1) Personnel compensation for equipment operators, machine programmers (for continuous programming of new applications, reprogramming old applications, testing, debugging), supervisors, and clerical support.

(2) Machine rentals, including provision for testing revised or new programs.

(3) Maintenance of purchased equipment (maintenance of rented equipment is usually provided for by the manufacturer as part of the rental cost).

(4) Major supplies, such as punched cards, magnetic or paper tapes.

A hypothetical but typical representation of cost trends, in a case where a system using ADP equipment is justified on the basis of a reduction in data processing costs, is contained in Attachment B.

c. Impact of proposed system. The adoption of an ADP equipment-oriented system may have a pronounced effect upon an organization in terms of (1) reassignment of functional responsibilities involving basic changes in organizational structure; (2) training and recruitment of ADP specialists; (3) displacement, retraining, or reassignment of personnel whose jobs are eliminated; (4) employees' adaptation to a completely revised set of procedures; (5) auditing considerations, etc.

There should be an indication that the responsible officials of an agency are giving full consideration to these potential impacts in planning for the installation of ADP equipment, including the development of appropriate measures to minimize the adverse effects upon personnel whose jobs are eliminated or changed by the new system.

Further, there should be an indication that the "customers" of the system are prepared to use new information products of the system and to make such adjustments as are required by the system to assure its success.

d. Features of the proposed system. There are several features which, if present in the proposed system, indicate a recognition of the special contribution which the computer, because of its speed, accuracy, memory and capacity to obey predetermined instructions (all of which far exceed the capabilities of methods previously available) can make toward systems improvement. These features are:

(1) The performance of new work, or the rendering of better and more timely service or products to both Government and the public, which is necessary but was not feasible to accomplish within the limitations of the previous system. (Example: scientific and engineering applications which involve a depth of calculation or analysis not practical by any other method; improved service on benefit claims to veterans and annuitants.)

(2) The use of operations research techniques involving the application of mathematical formulae to the solution of management problems. (Example: the awarding of jet fuel contracts for the military services under a least-cost procurement and distribution plan; the application of economic order quantity formulae to inventory control procedures.)

(3) The integration of basic data, common to many functions, into a single master information system. (Example: the integration of data common to the payroll, personnel, and accounting functions.)

(4) The integration of data processing systems between agencies, or between private industry and the Government. (Example: the provision by the Veterans Administration of information on magnetic tape for the automatic issuance of veterans' benefit checks by the Treasury Department and the subsequent automatic geographical sorting of the checks to facilitate delivery by the Post Office Department; reporting industrial wage earnings to Social Security Administration by magnetic tape.) Government efforts to achieve appropriate standardization of ADP equipment and techniques, including substantial support of the American Standards Association program in this field, give promise of alleviating some of the incompatibility problems which have impeded the exploitation of the potential benefits of data interchange in machine-sensible form.

(5) The use of "management by exception" techniques whereby transactions are automatically processed by the computer without review by humans except for special predetermined situations.

(Example: the routine electronic processing of supply requisitions except when the supply of the requisitioned item falls below a predetermined level.)

It does not necessarily follow that systems which do not incorporate these features are less than the best. There may be instances where no significant changes to a system are necessary other than to use a computer instead of punched-card equipment, but where substantial benefits by way of reduced costs are nevertheless achieved. On the other hand, there may be cases where potential benefits are not derived because of a failure to give appropriate consideration to possibilities of the types described above.

3. Other aspects of the system study which may be of interest or concern to a budget examiner but which generally involve greater detail include: (a) a description of the end products to be produced by the system and the value of their intended useage (i.e., reports, documents, forms, etc.); (b) a description of the data sources used in the system; (c) a description of the major data files; (d) frequency and need for updating the major data files or producing end products; (e) volumes of data involved; (f) flow charts of processing procedures; (g) implementation schedule; and (h) ADP equipment specifications, if any, such as required delivery dates, need for compatibility, and performance standards.

4. The scope and depth to which these aspects (see 2 and 3 above) appear in a given system study may vary. Some systems (e.g., some scientific and engineering systems) may not be susceptible to an advance precise definition of data sources, data outputs, frequencies, etc., and the statement of requirements may need to be in more general terms. Large, complex business management systems on which there is no substantial prior ADP experience will usually require a comprehensive and thorough study. Studies in connection with the acquisition of additional ADP equipment or replacement of existing equipment may or may not include all elements depending upon the extent of the system change that is contemplated thereby. In any event, the essential point is that the study should be sufficiently comprehensive to permit a sound judgment to be made on the recommended course of action. Bureau of the Budget Circular No. A-54 provides that these studies be documented. They are, therefore, presumably available for review by Bureau of the Budget examiners and other professional staff as the need arises.

5. Applications Locator File. Consideration is currently being given to establishing a central applications locator file which will enable agencies who are considering a given ADP application to identify other agencies who have already developed and have operational a similar application, thus reducing considerably the time and expense of developmental work.

6. *Relationship to budget time schedule*. There may be instances when, because of the budget time schedule, an agency will need to include in its budget request funds for an ADP installation before it has completed its system study. The absence of a study under such circumstances should not, by itself, result in a disallowance of the request. Although the time cycle for acquiring ADP equipment may vary widely according to circumstances, normally a system study may require 4 - 18 months for completion followed by an 8 - 18 months' wait for delivery of the equipment.

7. *Possibility of sharing equipment*. If the system study concludes that ADP capability is needed, it may be possible to acquire this capability by using equipment already available elsewhere instead of acquiring new equipment solely to satisfy the requirements of the proposed system. When time-sharing can be accomplished without serious interference with the performance of the systems involved, such arrangements should be adopted as a means for effecting substantial reductions in the cost of equipment through increased utilization. (For example: in the case of rented equipment, use of the machines for each hour over the basic rental charge (which provides 176 hours of use per month) is usually billed at only 40 percent of the basic hourly charge.) Sources for potential sharing arrangements are: (a) other ADP installations within the department; (b) Regional Sharing Exchanges (currently operating in the Philadelphia Region and being extended to nine other regions); (c) Computer Service Center/Sharing Exchange being established on an experimental basis by the National Bureau of Standards; (d) commercial ADP service centers operated by manufacturers of equipment, or others. Another consideration is the possibility of obtaining, for the *proposed* system, equipment which *exceeds* the requirements of the system in order that time might be available to others within the same agency who also have a foreseeable use for equipment but not in sufficient volume to justify equipment of their own. In such instances, however, great care should be exercised to assure that such additional requirements do exist and that the excess or reserve capacity will not go unused at an added cost to the agency.

C. THE SELECTION OF APPROPRIATE EQUIPMENT

Bureau of the Budget Circular No. A-54 provides three general policy statements governing the selection of appropriate ADP equipment. These are:

1. Selections of equipment will be made within the framework of system specifications which set forth (a) the system objectives, (b) the data processing requirements, and (c) any ADP capabilities that may need to be identified. System specifications provide the framework for determining the range of equipment characteristics needed to do the job (e.g., memory capacity, speed, input and output features). Without them, the selection of equipment becomes largely a matter of guesswork usually involving a high element of risk, particularly in view of the extensive costs involved in preparing for the use of equipment which later may turn out to be inadequate or too elaborate for the purpose. Except in otherwise justifiable circumstances, it is prudent therefore to delay decisions on ADP equipment selection until these specifications (the development of which is an integral part of a system study) are available.

2. The selection process will accord equal opportunity and appropriate consideration to all manufacturers who offer equipment capable of meeting system specifications. This policy is directed toward stimulating the competitive process so as to obtain the advantages resulting from such competition. The selection of the most appropriate equipment, from among many that will usually be available, requires agencies to be knowledgeable about the capabilities and features of each. This knowledge is usually obtained by presenting to each manufacturer a statement of the system specifications and inviting him to submit a proposal which in his judgment represents the best equipment configuration that he can offer to do the job. When this method is used it is important that the proposals be carefully reviewed to assure they are presented on the basis of a comparable understanding of the system specifications and are accurately prepared. Such a solicitation of proposals does not constitute a formal invitation to bid for a contract in the usual sense, since contract terms and prices for commercially available ADP equipment are included in the Federal Supply Schedule contracts negotiated annually by the General Services Administration. The solicitation represents a device for securing the manufacturer's freely volunteered recommendation as to how his equipment can best meet the specifications. This method, although usually advocated, is not mandatory upon the agencies; some may have developed an in-house knowledge of equipment capabilities which enables them to exercise a judgment without the advice obtainable from the manufacturer, or other circumstances may mitigate against such

a procedure in specific instances. The essential point of this policy is that whatever selection process is followed it should accord equal opportunity to all suppliers and should avoid any practices which could be construed to represent preferential treatment of any single supplier.

3. Two prime factors will be considered in the selection of equipment: (a) its capability to fulfill system specifications, and (b) its overall costs. Both factors are defined in the broadest sense. The term "system specifications" includes, in addition to the procedural requirements, such elements as required delivery date, need for equipment compatibility, level of maintenance, and standard of performance. The term "overall costs," in addition to the usual purchase or rental costs, includes personnel and supply costs, and such elements as the costs for site preparation, programming, providing necessary equipment compatibility (by adding conversion equipment when direct compatibility is not available), training, and necessary "software" services which must be provided by the agency in those cases in which one manufacturer provides them "free" within the quoted cost of the equipment but another manufacturer may not (e.g., "canned" programs may be available from one manufacturer's library but not from another). If equipment of more than one manufacturer is capable of meeting the system specifications, the policy stipulates that the equipment which represents the least overall cost to the agency will be selected. Any other factors, which are not reducible to either "capability" or "overall cost," are not normally to be considered unless a conclusive judgment cannot be made on the basis of these two prime factors.

Bureau of the Budget Circular No. A-54 requires that the factors and comparative analyses upon which the selection decision was made be fully documented; this documentation should therefore be available to examiners and other Bureau professional staff for review as necessary.

D. THE METHOD OF ACQUIRING SELECTED EQUIPMENT

1. Basic policy on methods to be used. Bureau of the Budget Circular No. A-54 provides guidance on the question of whether ADP equipment acquired directly from a manufacturer (suitable excess equipment not being available) is to be purchased, leased, or leased-with-option-to-purchase. The basic policy of this Circular is to require careful consideration of all acquisition methods available and to select that method which offers the greatest advantage to the Government under the given circumstances.

The long history of punched-card installations where, until 1956, it was possible to obtain most of this equipment only on a rental basis, and the tendency of the early users of computers to avoid purchase because of the uncertainty surrounding this new equipment, tended to establish a custom or tradition of renting equipment without serious consideration being given to other methods. Much of the uncertainty has been removed with the passage of time, during which successful uses of equipment have been demonstrated. Consequently, a greater number of situations are and will be encountered where considerable economic advantages will accrue if the ADP equipment is purchased. Therefore, the objective of this policy is to assure that full consideration is given to each method of acquisition before a decision is made. Circular No. A-54 does, however, provide some guidelines which set forth conditions under which each method seems preferable. Circular No. A-54 also requires that the analysis leading toward the determination of the method of acquisition be documented; this documentation therefore should be available to examiners and other Bureau professional staff members as the need arises.

2. Purchase method. Bureau of the Budget Circular No. A-54 (Paragraph 5) sets forth three conditions under which the purchase of equipment would be advantageous, provided all of them apply. Briefly, these are:

a. The system study indicates that the ADP equipment can be used successfully and advantageously. The assurance with which a prediction of success can be made will depend largely on (1) the quality of the system study itself, coupled with (2)experiences of other installations with similar applications. There are, of course, other factors bearing upon the probable success, including management's attitude toward the proposal and the capabilities of the organization to be charged with installing and operating the systems.

b. The comparative cost analysis indicates that the cost advantage point will occur within six years of the delivery of the equipment. The cost advantage point is that point in time when the accumulated monthly rental costs under the rental method equal, and thereafter exceed, the purchase price plus accumulated maintenance costs.

Normally, this point occurs in about 4½ years if the computer is used on a 1-shift-a-day basis, but occurs as early as 3½ or 2½ years as utilization increases to 2 or 3 shifts a day. The guideline which provides that computers should not be purchased if the cost advantage point does not occur within six years will not normally, therefore, rule out purchase. The six-year concept is simply a precautionary guideline which represents a subjective judgment (open to change if events so indicate) that it would be unwise, from the standpoint of potential technological obsolescence and the difficulty of predicting long-range system requirements, to invest capital funds if a cost advantage cannot be obtained within that time. On the other hand, the factor of technological obsolescence should not weigh heavily against purchase if a cost advantage can be obtained within six years and if the presently available equipment is expected to be able to do the job that needs to be done. The freedom to engage in frequent modernization of equipment, which rental arrangements are purported to provide, is often more apparent than real. Replacement of equipment is usually very costly, since it may involve site modifications, extensive conversion of system design and programming for adaptation to the new equipment, retraining, etc. It should not, therefore, be undertaken lightly. Finally, a preoccupation with continuous equipment modernization may usurp the time and effort that might more profitably be devoted to developing new techniques or systems to be used on the existing equipment.

Attachments A and B to Circular No. A-54 provide typical examples of the kind of comparative cost analyses of alternative methods of acquisition that will usually be developed.

c. The equipment will be needed and will satisfy the system requirements current and projected, for a period beyond the cost advantage point. The existence of this condition for purchase may be difficult to determine. Often there will be uncertainties about whether the kind of equipment under consideration will be satisfactory for the requirement, or whether the equipment will have adequate capacity for future requirements. These uncertainties may be sufficiently valid to warrant a decision against immediate purchase, especially in those cases where ADP experience on similar applications has been limited or is nonexistent, or where the program is subject to dynamic and unpredictable change. On the other hand, these uncertainties may well be evidence of an inadequate system study which did not concentrate sufficiently on those aspects which determine the system requirements and the kind of ADP equipment capability required. In these latter cases, the decision to install equipment should be regarded as premature, unless other justifiable circumstances exist.

d. Agency-wide consideration. The considerations listed above should be applied initially with respect to the activity planning to install the computer. In those cases where the conditions at the activity do not favor purchase, these considerations should be extended to include the possibility that the computer, when no longer required for its original purpose, might be used elsewhere in the agency, thus enabling the agency to capitalize on the economic advantage of purchase.

3. Lease-with-option-to-purchase method. There may be instances where it is desirable to proceed with the acquisition of equipment but the conditions for purchase have not been fully satisfied, because of impending decisions on program requirements or perhaps because of the need to obtain a short period of operational experience to test out a new system concept. In such cases, a lease-with-option-to-purchase arrangement is obtainable with most contracts. This arrangement involves an additional out-of-pocket cost to the Government because usually only a portion (varies in the neighborhood of 50-70 percent) of the rentals paid prior to exercising the purchase option is creditable to the purchase price.

In most cases, an option-to-purchase clause is automatically included in a lease contract without charge. One major supplier requires a deposit of 1 percent of the purchase price at the time of lease in order to secure a purchase option. This deposit is forfeited if the option is not exercised in two years.

4. Lease method. This method should be used when the conditions favorable to purchase or lease-with-option-to-purchase do not exist. These lease transactions should, however, remain under continuous review for possible conversion to purchase if changing conditions make such action advisable.

5. Maintenance of purchased equipment. A decision for purchase raises the further question as to how the equipment will be maintained. Purchase contracts on the Federal Supply Schedule require the supplier of the equipment also to furnish maintenance services if requested to do so. This procedure is followed by most agencies. A few agencies have found it advantageous, under certain circumstances, to provide in-house maintenance. The Bureau of the Budget is currently studying the relative merits of in-house maintenance vs. contractor maintenance, including the possibility of providing centralized maintenance services, to provide policy or guidance on this question.

6. Readiness reviews. Paragraph 5b of Circular No. A-54 provides for a review of readiness prior to accepting delivery of ADP equipment. This is intended to prevent situations where an agency accepts delivery of a computer before it is ready to use it. Readiness reviews, normally conducted 1 to 3 months before the scheduled delivery date, are a useful technique to assess progress on the development of the applications procedures, site preparation, programming, personnel recruitment and training etc., to assure that productive use can be made of the computer upon acceptance. If not, delivery dates can usually be renegotiated to fit the circumstances. This technique is especially valuable where the computer is being rented since rental costs begin upon delivery and acceptance--not upon use. Bureau of the Budget Circular No. A-54 provides that readiness reviews will be documented. They should, therefore, be available for review by examiners and other Bureau professional staff as the need arises.

E. THE EVALUATION OF ADP INSTALLATIONS

1. Two basic purposes are served by a periodic formal evaluation of ADP equipment-oriented systems:

a. For the ADP installation, it provides a measure of actual accomplishment against specific expectations which is useful in (1) detecting areas for improvement, (2) determining possibilities for the future development of the system, and (3) formulating a judgment on whether the system has, in fact, resulted in a satisfactory cost/benefit relationship.

b. For the agency, it provides a documentation of operational experience which is valuable in assessing the agencywide ADP program; i.e., the validity of agency objectives, plans and time schedules, and the adequacy of policies and guidelines applicable to ADP installations.

2. The time at which initial evaluations should be made will vary according to circumstances. Where the system changes wrought by ADP equipment are far-reaching, an operational period of as much as a year or more will probably need to elapse before a reasonable evaluation of the results can be made. In these cases, however, it may be desirable to conduct an interim limited evaluation, within 6 months of installation, to detect as early as practicable the need for substantive revisions to the design or other corrective action. Where extensive system changes were not required by the use of ADP equipment, evaluations should normally occur 6-12 months after the system becomes operational. Subsequent evaluations should be made as appropriate and as dictated by normal management review practices.

3. Persons participating in and conducting the evaluations should be knowledgeable of the system being evaluated but, preferably, not directly associated with its design or operation so as to permit as objective an evaluation as practicable.

4. Elements of evaluation. The evaluation of the system should be made primarily in terms of the objectives and expectations (updated) set forth in the study which formed the basis for the decision to install the system. Within this framework, consideration of the following elements should be included:

a. What specific advantages have resulted from the use of ADP equipment? These will normally be stated in procedural terms, e.g., specific identification or more timely processing of certain data, availability of information not previously obtainable, greater scope and depth of analyses, increased accuracy of information, computational capacity not previously attainable, etc.

b. What effect have these advantages had upon the effectiveness with which the program function is accomplished? The purpose of this question is to test the ultimate value of the procedural advantages previously identified. It becomes crucially important in those instances where the procedural advantages have been obtained at additional cost. Often it is a very difficult question to answer because (1) factors other than the installation of ADP equipment may have had a concurrent (and often counteracting) effect upon program accomplishment over a period of time so that it is difficult to assess the singular effect of ADP and (2) a system for measuring the effectiveness of program accomplishment may not exist, in which case there is no gauge to judge the effect of any change, ADP or otherwise.

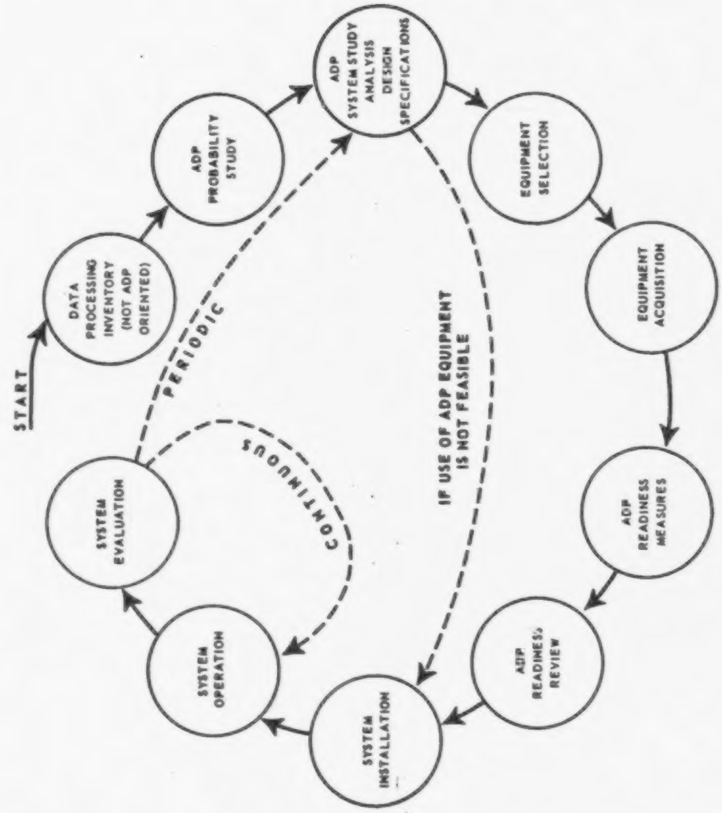
c. What effect has the ADP system had upon the total costs of (1) data processing, and (2) functions supported by the data processing system? The purpose of this question is to enable the worth of the benefits previously identified to be assessed in terms of the costs involved in producing them. A typical answer to this question may indicate that the costs of data processing have increased by virtue of installing more expensive equipment, but that the costs of functions supported by the system have been reduced by eliminating jobs now performed by the equipment (e.g., the elimination of auditors in the voucher examination function) or, the increased cost of data processing may have been offset by the effect of better practices resulting from improved data processing (e.g., reductions in inventories because of a better inventory control system, or less costly construction costs because of better engineering analyses).

Corollary to an examination of the effect of the use of ADP equipment is the need for an examination into the operation of the ADP installation itself (e.g., the performance, utilization, and scheduling of the equipment; the organization; and the adequacy of the staffing pattern).

Attachments - 2

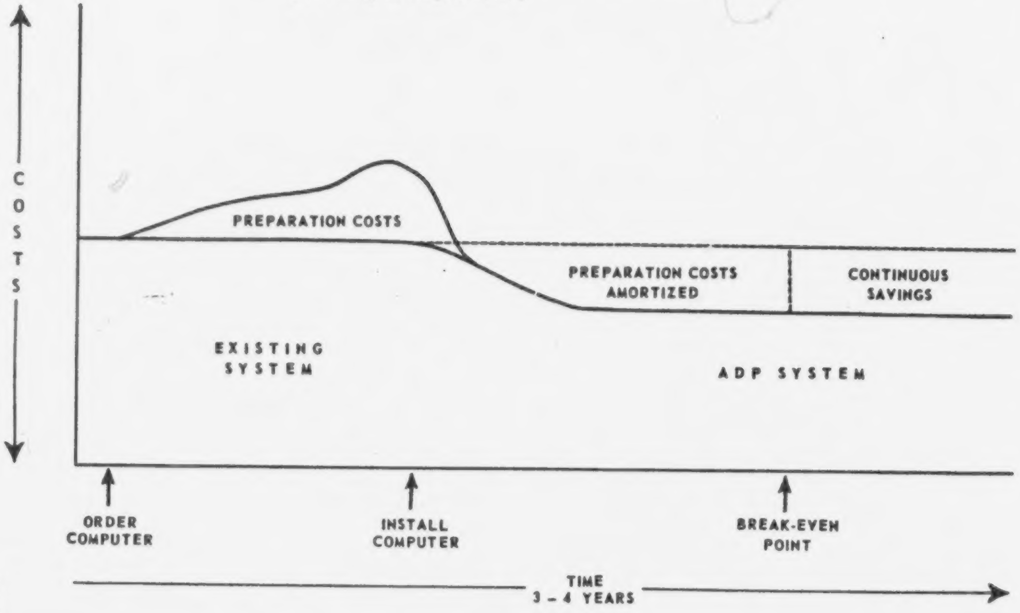
ATTACHMENT A

THE DATA PROCESSING MANAGEMENT CYCLE



ATTACHMENT B

REPRESENTATION OF COST TRENDS FOR ADP INSTALLATION
(This illustration assumes that the ADP system will accomplish the same work as the existing system, but at less cost. In many cases, the ADP system will cost more than the previous system but will enable more work to be done than before or will effect other management inprovements.)



GPO 863-259

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

MARCH 6, 1965 CIRCULAR No. A-71

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Responsibilities for the administration and management of automatic data processing activities

1. Purpose. This Circular identifies certain responsibilities of executive agencies for the administration and management of automatic data processing (ADP) activities, and is intended to provide for maximum cooperation and coordination between and among the staff and operating agencies of the executive branch.

2. Scope. The ADP equipment affected by this Circular is that equipment identified in paragraph 2 of Bureau of the Budget Circular No. A-54, Policies on the selection and acquisition of automatic data processing (ADP) equipment, October 14, 1961.

3. Responsibilities of the Bureau of the Budget. The Bureau of the Budget will provide overall leadership and coordination of executive branch-wide activities pertaining to the management of automatic data processing equipment and related resources and will develop programs and issue instructions for achieving increased cost effectiveness through improved practices and techniques for the selection, acquisition and utilization of automatic data processing equipment and resources. In this connection, the Bureau of the Budget will:

a. Provide policies and criteria, procedures, regulations, information, technical advice and assistance to executive agencies.

b. Evaluate, through the review of agency programs and budgets and through other means, the effectiveness of executive agencies and the executive branch as a whole in managing automatic data processing equipment and resources.

c. Foster adequate Federal Government support of programs for developing voluntary commercial standards for automatic data processing equipment and techniques, arrange for the approval and promulgation of voluntary commercial standards when it is in the best interests of the Government to do so, and arrange for the development, approval and promulgation of Federal standards for automatic data processing equipment and techniques on an interim basis, or permanent basis, when voluntary commercial standards are not available or usable.

d. Support the development and promulgation of standard data elements and codes in Government systems, when such data elements and codes are in common use in some or all executive agencies.

e. Encourage the use of advanced techniques in the design of data systems and support research in advanced system design through demonstration projects.

f. Advocate intra-agency and interagency integration of systems.

g. Sponsor the development of a system which provides to line and staff officials at all levels of Government the information needed for effective management of automatic data processing equipment and related resources.

4. Responsibilities of the General Services Administration. The General Services Administration is responsible for aiding in the achievement of increased cost effectiveness in the selection, acquisition and utilization of automatic data processing equipment and appropriate related resources and will perform the following functions:

a. In connection with the selection of automatic data processing equipment, provide to executive agencies, on request, comparative information on the characteristics and performance capabilities of equipment and on the contractual performance of the firms that supply equipment and programing aids to the Government.

b. In connection with the acquisition of automatic data processing equipment (1) provide Federal Schedules of Supply for renting, purchasing and maintaining automatic data processing equipment, for use by executive agencies each fiscal year, (2) take such steps as may be feasible and necessary to insure to the extent practicable, that the Federal Schedules of Supply for ADP equipment each year will be available for use on the first day of that year, and (3) through continuous study and negotiation, seek improvements in the terms, conditions, and prices stated in Federal Schedules of Supply for automatic data processing equipment and services.

c. In connection with the utilization of automatic data processing equipment (1) develop and publish guidelines and criteria governing the replacement of equipment to avoid usage of such equipment beyond the point of economic advantage, (2) provide overall coordination and leadership of the executive branch in fostering the effective utilization of excess and disposal of surplus automatic data processing equipment, including rented, leased or owned equipment, and promulgate such regulations as may be needed to insure effective Government-wide screening and utilization of excess ADP equipment; and, further, to plan and undertake appropriate measures for coping with emerging problems associated with the management of excess and surplus automatic data processing equipment, (3) prepare Government-wide inventory reports and other statistical information pertaining to ADP equipment utilization, based upon reports submitted in accordance with applicable Bureau of the Budget circulars; and, further, to cooperate in the continuous refinement and improvement of management information systems relating to automatic data processing activities, (4) exercise leadership for the executive branch in the development and operation of arrangements which are designed to promote the sharing and joint utilization of automatic data processing equipment time and services within and among the executive agencies, and obtain such information on sharing practices as is necessary to evaluate the sharing program on a Government-wide and regional basis, including acquisition of equipment in connection with joint utilization programs, and (5) provide policies, guidelines and evaluation criteria for use by executive agencies in the maintenance of automatic data processing equipment.

d. In connection with the standardization of automatic data processing equipment and techniques, (1) promulgate standard purchase specifications based upon ADP standards which have been approved for adoption by the Federal Government, and (2) support programs for the development of voluntary commercial or Federal standards as they pertain to automatic data processing equipment and techniques and coordinate these activities with other executive agencies similarly involved.

e. In connection with automatic data processing equipment used with data communications systems, insure that planning for the Federal Telecommunications System embraces consideration of the rising need for data communication facilities which provide for high-speed data transmission between computer-based systems.

5. Responsibilities of the Department of Commerce. The Department of Commerce is responsible for aiding in the achievement of increased cost effectiveness in the selection, acquisition and utilization of automatic data processing equipment, and in this connection will perform the following functions:

a. Provide advisory and consultative services to executive agencies on the methods for developing information systems based on the use of computers and the programing and languages thereof.

b. Undertake research on computer sciences and techniques, including system design, oriented primarily toward Government applications.

c. Provide day-to-day guidance and monitorship of an executive branch program for supporting the development, measurement and testing of voluntary commercial standards for automatic data processing equipment, techniques and computer languages.

d. Improve compatibility in automatic data processing equipment procured by the Federal Government by recommending uniform Federal standards for automatic data processing equipment, techniques and computer languages.

6. Responsibilities of the Civil Service Commission. The Civil Service Commission is responsible for providing executive branch-wide leadership and assistance in the personnel management and manpower aspects of automatic data processing. In this connection, the Commission will foster programs designed to:

a. Staff automatic data processing activities effectively by, among other things, (1) formulating position classification and qualification standards, (2) developing necessary special recruiting techniques, (3) devising improved testing and selection devices, and (4) stimulating and coordinating necessary training.

b. Educate executives and other key personnel to achieve greater effectiveness in ADP management.

c. Anticipate and minimize, to the greatest practicable extent, any adverse effects of automatic data processing upon the people involved.

d. Provide a medium within the executive branch to focus and coordinate preparation for the future personnel management and manpower effects and requirements of automatic data processing.

7. Responsibilities of the heads of executive agencies. The heads of all executive departments and establishments are responsible for the administration and management of their automatic data processing activities including:

a. Agency-wide planning, coordination and control of equipment utilization.

b. Determination and use of those equipment applications that offer the greatest return in terms of increased effectiveness in mission accomplishment and higher productivity.

c. Development of data systems that employ the use of the most advanced design techniques.

d. Merger or integration of data systems irrespective of intra-agency or interagency organizational lines, when cost effectiveness in equipment utilization, data systems management, or program accomplishment can be increased.

e. Determination of automatic data processing equipment requirements.

f. Sharing equipment time and services within the agency, and with other agencies through support of the Government-wide program for sharing exchanges; cooperation in the establishment of service centers and other interagency joint use arrangements.

g. Consideration of the potential impact of the introduction of ADP equipment on the agency work force and taking such steps as are necessary to alleviate adverse effects to the greatest extent practicable.

h. Participation in Government-wide studies and programs for improving the administration and management of automatic data processing activities in the executive branch.

8. Effective date. The provisions of this Circular are effective immediately.

KERMIT GORDON
Director

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

July 3, 1968

CIRCULAR NO. A-79
Revised

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Report of accomplishments in the use and management of automatic data processing (ADP)

1. Purpose. This Circular establishes a requirement for an annual report on agency accomplishments in the use and management of automatic data processing. This revision, which supersedes Circular No. A-79, Revised, dated May 23, 1967, permits a selective reporting of accomplishments and places the report on an annual instead of semiannual basis.

2. Background. In his Memorandum for the heads of executive departments and agencies dated June 28, 1966, the President directed the head of each Federal agency to explore and apply all possible means for (a) using the electronic computer imaginatively to provide better service to the public and to improve agency performance and reduce costs, and (b) managing electronic computer activities at the lowest possible cost. The President also directed the Director of the Bureau of the Budget to report on the progress that the Federal Government is making in these respects.

3. Report coverage.

a. Agency reports will cover selected accomplishments related to the use and management of both commercially-available computers and computers built to special specification, excluding those that are used in a weapons system. Smaller agencies which rely on others for the provision of computer capability will include such uses in their reports as appropriate.

b. Agency reports will cover Government contractors who operate computers in the performance of work under cost reimbursement contracts and subcontracts when (1) the equipment is leased and the total cost of leasing is to be reimbursed under one or more cost reimbursement-type contracts, or (2) the equipment is purchased by the contractor for the account of the Government or title will pass to the Government, or (3) the equipment is furnished to the contractor by the Government, or (4) the equipment is installed in Government-owned, contractor-operated facilities.

4. Report guidelines and format.

a. Each agency will prepare a summary-type report describing, in concise fashion, accomplishments during the reporting period. It is not intended that an agency report all its accomplishments. The report should consist of a selection of those accomplishments which the agency considers to be significant, unique, or typical, or which represent new and noteworthy areas of application. As a general rule, no agency report should exceed four pages. Guidelines and the format to be used for reporting are provided in Attachment A.

b. Certain of the accomplishments that come within the scope of this Circular may also be identified in reports made to the Bureau of the Budget in accordance with Circular No. A-44 entitled "Cost reduction and management improvement in Government operations." Nevertheless, any such accomplishments will be reported and described in accordance with the guidelines provided in Attachment A of this Circular.

5. Reporting dates and periods to be covered. The reports will be submitted annually on September 1 to cover the previous fiscal year. Negative reports will be furnished. All reports will be submitted in duplicate to the Bureau of the Budget, Attention: General Government Management Division, ADP Management Staff.

CHARLES J. ZWICK
Director

Attachment

Form Approved
Budget Bureau No. 80-R177

ATTACHMENT A
Circular No. A-72
Revised

ANNUAL REPORT OF ACCOMPLISHMENTS IN THE USE AND MANAGEMENT OF AUTOMATIC DATA PROCESSING

Agency ________________________ Period Covered ______________

Person to contact regarding report:

Name ________________________________ Phone ______________

I. ACCOMPLISHMENTS IN THE USE OF ELECTRONIC DIGITAL COMPUTERS.

A. Description of section I. Under section I, using the categories shown below, describe selected accomplishments from the use of computer-based systems that were initiated or refined during the report period. The selection should be made from those accomplishments which the agency considers to be significant, unique, or typical, or which represent new and noteworthy areas of application. Each accomplishment should be described concisely in no more than 50-75 words, using lay terms and avoiding the use of abbreviations or acronyms. The description should include a reference to the specific agency program or function in which the computer is used, and should state the major benefits being derived. The benefits should be stated as specifically as possible, using quantitative terms whenever feasible, so that the advantages being gained by the use of the system are clearly evident. Cost and personnel reductions will be stated on a net basis, or will cite both gross reductions and offsetting increases.

B. Categories of benefits. Accomplishments under section I will be reported under the following categories of benefits, as applicable:

1. Cost reductions and greater efficiency. In this category include lower operating costs, avoidance of greater costs, improved personnel utilization, improved service and other similar types of benefits.

2. Program achievements not feasible without computer capability. In this category include accomplishments in scientific, engineering and large-scale data processing activities which are dependent upon high-speed computational or data processing capability, and other types of accomplishments which are feasible only with the aid of the computer.

3. Other (identify). Use this category only if categories 1 and 2 are not applicable. For example, it should be used to describe new areas of application which have not yet produced tangible evidence of benefits that would be reportable under categories 1 and 2.

If an accomplishment straddles more than one benefit category, it should be reported only under the category the agency considers most appropriate, but the description should cover the full range of benefits.

C. Examples of reports. Examples of the way accomplishments should be reported under each of the categories in section I are given below:

1. Cost reductions and greater efficiency. The Internal Revenue Service automated the analysis of delinquent taxpayers' accounts and the issuance of a second notice of delinquency. This has eliminated much of the need for collection officers to prepare their own correspondence and make personal contacts. The reduced manual workload has permitted an annual recurring saving of $587,000, including 128 man-years of effort.

2. Program achievements not feasible without computer capability. The assignment plan for television broadcast channels was improved to the extent that 24 additional and valuable channels became available in places where they were badly needed. This improvement was achieved by evaluating more accurately the impact of each channel assignment on the efficiency of the total plan. The extensive calculations required for this purpose were performed by the computer in a few days, but would have required 18 man-years of manual effort.

II. ACCOMPLISHMENTS IN THE MANAGEMENT OF AUTOMATIC DATA PROCESSING (ADP) ACTIVITIES.

A. Description of section II. Under section II, using the categories shown below, describe on a selected basis significant, unique, or typical accomplishments during the report period that concern the management of ADP activities, as distinguished from the uses of computers which are reported in section I of the report. Each accomplishment should be described concisely in no more than 50-75 words, using lay terms and avoiding the use of abbreviations and acronyms.

B. Categories. Accomplishments under section II will be reported under the following categories, as applicable:

1. standardization of computer-based data processing systems, or segments thereof, within or among agencies (if not reported in section I);

2. integration of computer-based data processing systems on an interagency and intra-agency basis (if not reported in section I);

3. initiation or completion of research and development activities intended to improve ADP technology;

4. initiation or completion of research and development activities intended to improve ADP systems and programming techniques;

5. consolidation of computer facilities and staffs, such as systems development and programming staffs;

6. sharing of computers and ADP personnel;

7. use of excess equipment in lieu of acquiring additional equipment;

8. use of excess Government-owned equipment to permit the release of rented equipment;

9. maintenance of equipment by in-house personnel in lieu of commercial contract;

10. negotiation of equipment procurement contracts under terms more favorable than those provided in the Federal Supply Schedule; or

11. other (identify).

In all cases, the benefits obtained from the reported actions, including cost and personnel savings, should be specifically identified.

C. Government-wide programs. The General Services Administration and the Department of Commerce will report, under appropriate category headings, their accomplishments under Government-wide programs for which they have responsibility under Public Law 89-306.

III. PLANS FOR THE FUTURE.

A. Description of section III. Under section III, using the headings shown, describe in a summary form significant actions planned or under way in the agency which are expected to result in accomplishments that will then be reportable in sections I or II in future reports. A statement of anticipated benefits will be included in the description.

B. Headings. The plans will be described under the following headings:

1. Use of electronic computers. Include plans related to the kinds of actions specified under section I.

2. Management of ADP activities. Include plans related to the kinds of actions specified under section II.

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

September 30, 1967 CIRCULAR NO. A-86

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Standardization of data elements and codes in data systems

1. Purpose. This Circular identifies responsibilities and provides policies and guidelines for the management of activities in the executive branch regarding the development and application of standard data elements and their related codes in data systems.

This Circular is issued under the authorities of Sections 103 and 104 of the Act of September 12, 1950 (31 U.S.C. 18a and 18b), Executive Order No. 10253 dated June 11, 1951, and the Act of October 30, 1965 (Public Law 89-306). This Circular complements the standards and recommendations that have been or may be issued under the statistical procedures prescribed by Circular No. A-46. Data elements and codes which are required to be unique for use in cryptologic activities are excluded from the provisions of this Circular.

2. Background. Technological advances in computers, communications and allied fields make possible the integration of data systems and the aggregation and exchange of data among them on an expanding scale. These advances have contributed to substantial cost reductions and improvements in systems and services. The full effect of these advances will not be realized, however, unless the need for uniform understanding (definition) of the common information (data elements) and expression of them (codes) in data systems is recognized and a means provided to develop and apply desirable standards. There are increasing interrelationships developing among the data systems of Federal, State and local governments, and with industry and the public, that add emphasis and dimension to this need.

3. Objectives. The ultimate goal is to achieve the greatest practicable degree of uniformity in data elements and codes used among related data systems. The chief objectives are -

a. to facilitate the summation of information and thereby enhance the exchange of information among data systems;

b. to facilitate the review and analysis of the budget processes and programs of the executive branch concerning more than one agency;

c. to encourage the extension of the principle of systems integration under which information can directly be communicated among data systems without interrupting the process for translations or conversions; and

d. to contribute to improving the products and effectiveness of data systems.

4. Definitions. For the purpose of this Circular, the terms "data element" and "data code" are defined as follows -

a. A data element is a grouping of informational units which has a unique meaning based on a natural or assigned relationship and sub-categories (data items) of distinct units or values. For example, "month" is a data element whose data items are "January," "February," "March," etc.

b. A data code is a number, letter, symbol or any combination thereof used to represent a data element or a data item.

5. Kinds of standards. For the purpose of this Circular, the kinds of standard data elements and codes are identified as follows -

a. International standards. A wide range of standards, including data elements and codes, having broad acceptance and the approval of the International Standards Organization, for voluntary use by a community of nations.

b. United States of America standards. A wide range of standards, including data elements and codes, having broad acceptance and the approval of the United States of America Standards Institute (formerly the American Standards Association), for voluntary use by Government and industry on a national scale.

c. Federal standards (data elements and codes). Standards, promulgated under the provisions of this Circular, for use in the executive branch. In terms of application, there are two categories of Federal standards -

(1) General use. Federal general standards (such as for countries, States, counties, places, organizations, individuals and elements of time) **for general use by most agencies in connection with an extensive number and variety of related or unrelated data systems and programs.**

(2) Program use. Federal program standards for use in particular related programs concerning more than one agency. Examples are data elements and codes usually limited to use in weather, personnel, supply, and other similarly unique systems. In these cases, the same source data

often are used by several agencies and aggregation and exchange of information on a program basis are the rule.

d. Agency standards (data elements and codes). Standards limited for use within the programs of a particular agency and either not applicable to or not yet incorporated into a Federal standard.

6. Policies. The following policies apply to the development and application of standard data elements and codes under this Circular -

a. Data elements and codes that can effectively be applied to the data systems of more than one agency will be promulgated as Federal standards. Federal general standards will be promulgated by or at the direction of the Bureau of the Budget. Federal program standards will be promulgated by the agency determined by the Bureau of the Budget to have the predominant interest in particular standards.

b. Expected technical, operating or economic benefits, or improvements in services are to be considerations in the decision to adopt particular standards.

c. Data elements and codes already in use will be adopted as Federal standards wherever practicable if they meet Federal requirements. United States of America or International standards will also be adopted under the same circumstances.

d. Promulgation of standards under this Circular will include a specification of applicability and a time-phased implementation schedule.

7. Responsibilities. Responsibilities under this Circular are outlined below. Exhibit 1 depicts these responsibilities in terms of actions taken in respect to the kinds of standards involved.

a. Bureau of the Budget. The Bureau of the Budget will provide leadership of a program for standardizing data elements and codes for use in the executive branch and in this connection will -

(1) Utilize the Federal Automatic Data Processing Advisory Council to advise the Bureau of the Budget regarding standards activities covered by this Circular.

(2) Arrange for appropriate departments and establishments to develop and maintain specific Federal general and Federal program standards.

(3) Arrange for liaison with organizations representing industry and State and local governments on standards of mutual interests.

(4) Approve, and arrange for the promulgation of Federal general standard data elements and codes covered by this Circular.

(5) Publish (with periodic revisions) a list of agency points of contact (see paragraph 7b.(8)).

(6) Provide for the preparation of guidelines and criteria to assist agencies, task forces and equivalent groups in developing standards.

b. Departments and establishments. Each agency will -

(1) Use the Federal standards announced under the provisions of this Circular whenever data are exchanged between and among agencies and to the maximum possible extent in meeting its own data system requirements.

(2) Assume such responsibilities as may be requested under paragraph 7a.(2) for organizing and chairing Government task forces or equivalent groups to develop and maintain Federal standards.

(3) Conduct the analyses necessary to provide recommendations to the Bureau of the Budget on specific Federal general standards assigned under paragraph 7a.(2). Included will be a summary of the agency consensus reached and the objections recorded or exceptions requested (and if and how they were satisfied), the scope of applicability, a time-phased plan for implementation, the benefits to be expected and cost implications.

(4) On its own initiative, or at the request of the Bureau of the Budget, conduct the analyses necessary, with participation of interested agencies, to develop appropriate Federal program standards and announce, implement and maintain such standards as are agreed upon among the agencies principally concerned. The agency points of contacts (see paragraph (8) below) are to keep the Bureau of the Budget informed on the progress and results of such efforts. Such standards as are approved will be forwarded to the National Bureau of Standards for inclusion in the Register of Program Standards.

(5) Develop Agency standards for data elements and codes where operations or services can be improved and there is no conflict with existing or proposed Federal general or Federal program standards and provide (with periodic revision) to the National Bureau of Standards the title and definition of such agency standards in effect in or under consideration by the agency.

(6) Provide appropriate representation on Government task forces or equivalent groups as may be established to develop Federal general or Federal program standards. Such representation should be from organizations having the predominant or a substantial interest.

(7) Recommend to the Bureau of the Budget actions to improve the program as a whole and areas having a potential for the development of standards.

(8) Designate a single office as the central point of contact on matters pertaining to this Circular.

c. National Bureau of Standards. The National Bureau of Standards will -

(1) Maintain a "Register of Data Elements and Codes - Federal General Standards." The Register will serve to record and codify Federal general standards approved under this Circular. The Register will be either the media for publishing announcements of Federal general standards or the point of identification and reference to the source if elsewhere published.

(2) Maintain a "Register of Data Elements and Codes - Federal Program Standards." The Register will serve to record and codify Federal program standards approved for use by agencies responsible for such standards. The Register will be either the media for publishing announcements of Federal program standards or the point of identification and reference to the source if published elsewhere.

(3) Maintain a "Reference File of Data Elements and Codes - Agency Standards." This file will identify Agency standards in effect and areas in which agencies are investigating adoption of standards. It will serve as an inventory of Agency standards and efforts to develop standards. The publication of Agency standards is the responsibility of agencies.

(4) Maintain an "Informational Register of Data Elements and Codes - International and American Standards." This register will identify standard data elements and codes that have been approved by the International Standards Organization or the United States of America Standards Institute or that may at any one time be the subject of development by them. It will serve as a point of inquiry for agencies regarding the status of such efforts. An abstract of the Informational Register will be distributed annually or more often if advisable to the central points of contact identified in paragraph 7b.(8).

(5) Provide technical advice and assistance, relating to automatic data processing and related data systems, to task forces or equivalent groups as may be established to develop Federal general and Federal program standards.

d. Development of United States of America Standards. The United States of America Standards Institute may from time to time request Government participation to develop particular American Standards for data elements and codes. In such cases, a "senior representative" will be named whose function will be to coordinate Federal participation to assure that all the factors essential to Government interests are brought to bear on the deliberations of the Institute.

(1) Where a Government or interagency task force or equivalent group exists, to develop a Federal standard for the same or similar purpose, the Chairman thereof should assume the role of senior representative.

(2) Where such a task force or equivalent group does not exist, the Bureau of the Budget will arrange that an agency, having the predominant or a substantial interest, name the senior representative.

8. Promulgation, implementation and maintenance of Federal general standards. The Bureau of the Budget will promulgate Federal general standards for data elements and codes by arranging for the issuance of announcements by the National Bureau of Standards. In addition to the Federal general standard(s), the announcements will include -

a. an identification of the agency that will maintain the standard(s).

The named agency should keep current with the progress of implementation.

b. a specification of applicability and authorized exceptions, and

c. time-phases within which the standard(s) will be implemented.

9. Exceptions, deferments and revisions of Federal general standards. The procedure for requesting exceptions or deferments or for recommending revisions to Federal general standards is as follows -

a. Requests for exceptions, not covered in an announcement, will be directed to the agency responsible for the standard. That agency will add its recommendations and forward it to the Bureau of the Budget.

b. Requests for deferments, regarding implementation dates contained in an announcement, will follow the procedure prescribed for exceptions when the request is for a deferment of over one year. Departments and establishments may revise implementation dates for good cause where the deferment does not exceed one year by forwarding a notification of such action to the agency responsible for the standard, stating the circumstances involved.

c. Recommendations for revisions to standards already announced will be directed to the agency responsible for the standard. That agency will utilize a task force, an ad hoc group, or take other appropriate steps to consider the proposal and formulate its recommendations to the Bureau of the Budget.

10. Promulgation, implementation and maintenance of Federal program standards. Agencies that have assumed the responsibility under the provisions of paragraph 7b.(4) to develop Federal program standards are also responsible for their promulgation, implementation and maintenance. Promulgation of Federal program standards will follow the same procedure and be of the same content as for Federal general standards identified in paragraph 8.

11. Exceptions, deferments and revisions of Federal program standards. Requests for exceptions or deferments or recommendations for revisions to Federal program standards are to be directed to the agency that has promulgated the standard. That agency is responsible for taking final action on the requests and recommendations.

CHARLES L. SCHULTZE
Director

Attachment

EXHIBIT 1
Circular No. A-86

PROGRAM FOR DEVELOPING STANDARD DATA ELEMENTS AND CODES

TYPES OF ACTIONS	KINDS OF STANDARDS			
	Federal General Standards	Federal Program Standards	Agency Standards	American Standards 1/
Initiation of efforts	BOB	Program Agency (or BOB)	Option of agency concerned	USASI
Method of development 2/	Government Task Force (or equivalent)	Interagency effort	Option of agency concerned	X3.8 Subcommittee of USASI
Recommendations	To BOB	To Program Agency	Option of agency concerned	To X3 Committee of USASI
Approval	BOB	Program Agency	Agency	USASI
Maintenance	Named Agency	Program Agency	Agency	As necessary
Publication: a. Preparation and distribution	NBS	Program Agency	Agency	USASI
b. Registration	NSB "Register of Federal General Standards"	NSB "Register of Federal Program Standards"	NSB "Reference File of Agency Standards"	NSB "Information Register of USASI Standards"

1/ *Industry and Government participation at all stages.*

2/ *Agency, intergovernmental, and other representation as appropriate.*

EXECUTIVE OFFICE OF THE PRESIDENT
BUREAU OF THE BUDGET
WASHINGTON, D.C. 20503

BULLETIN NO. 70-9

February 2, 1970

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Acquisition of peripheral components for installed ADP systems

1. Purpose. This Bulletin requires Federal agencies to review and make certain determinations on whether leased peripheral equipment components in computer systems supplied by the system manufacturer should be replaced with less costly equipment available from independent peripheral manufacturers or other sources.

2. Background. According to information provided by agencies under the ADP Management Information System (see BOB Circular A-83), there are many ADP systems in operation in which certain peripheral components currently being leased from the system supplier could be replaced with comparable components offered by independent manufacturers at substantial cost reductions. The Comptroller General's report of June 24, 1969, discusses in detail the possibility of achieving economies through a program for replacing installed equipment with "plug-to-plug" compatible peripheral units.

3. Agency reviews. Federal agencies will review all installed leased peripheral components for which there are compatible, reliable and comparable substitutes available at lesser cost to determine where substitutions should be made for cost saving reasons. To facilitate this review, the General Services Administration will, by February 6, 1970, transmit to each Federal agency a listing of all installed leased components which, as of June 30, 1969, were scheduled to be retained for a period long enough to assure the achievement of the potential cost reduction. Instructions on the use of this listing will be provided by the General Services Administration.

Each agency upon receipt of the listing will review it in consideration of the agency's present equipment retention plans and/or component substitution plans currently under way, and determine those instances in which substitution actions would be consistent with the plans. Following this determination and no later than April 15, 1970, the agency will advise the General Services Administration of the substitutions that should be made by returning an annotated copy of the listing. From the consolidated replies, the General Services Administration will be in a position to determine the additional procurement actions that should be taken and, in coordination with the agencies involved, will institute appropriate action. For those peripheral components on the General Services Administration listing which the agency determines should not be replaced with a lower cost substitute, the reason for such decision will be shown on the annotated list by the use of a decision code which will be included in the instructions provided by the General Services Administration.

ROBERT P. MAYO
Director

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

August 30, 1971

CIRCULAR NO. A-2
Revised

TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS

SUBJECT: Utilization, disposition, and acquisition of Federal real property

1. Purpose. This Circular rescinds and replaces Circular No. A-2, Revised, dated April 5, 1967. It expands coverage to include federally owned properties in foreign countries; states the Government's general policy with respect to utilization, disposition, and acquisition of Federal real property; provides guidelines for identifying real property that is not needed, underutilized or not put to its optimum use; revises the annual report which is required of each agency by this Circular; and reflects the role of the Property Review Board, established by Executive Order 11508 of February 10, 1970.

2. Coverage. The provisions of this Circular apply to all Federal real property under the jurisdiction of the executive branch, except those categories of real property specifically excluded in paragraph 2b, below.

a. For purposes of this Circular, Federal real property includes:

(1) Land, buildings, structures, and facilities (including Government-owned buildings, structures, and facilities located on other than Government-owned land) acquired by purchase, condemnation, donation, construction, lease, or other methods; and

(2) Public domain land withdrawn or reserved and assigned to Federal agencies for use within the Federal Government for such purposes as military installations, airfields, and research facilities.

b. For purposes of this Circular, Federal real property will exclude the following:

(1) Unreserved public domain (except as indicated in paragraph 5c);

(2) Real property which is to be sold or otherwise disposed of and which was acquired through (a) foreclosure, confiscation, or seizure in settlement of a claim of the Federal Government, or (b) conveyance to the Federal Government in connection with an indemnity or loan insurance or guarantee program;

(3) Rights-of-way or easements granted to the Government;

(4) Real property held in trust by the Federal Government;

(5) Oregon and California revested lands and reconveyed Coos Bay Wagon Road Land Grants (43 U.S.C. 1181a);

(6) Land administered by the National Park Service, other than administrative sites outside the established boundaries of a national park;

(7) Land administered by the Forest Service, other than administrative sites outside the established boundaries of a national forest;

(8) Land on Indian reservations within consolidation areas approved by the Secretary of the Interior;

(9) Land within the National Wildlife Refuge System;

(10) Real property located in the Panama Canal Zone; and

(11) Bankhead-Jones lands being administered under a land conservation and utilization program in accordance with the Taylor Grazing Act of 1934 (48 Stat. 1269).

3. Utilization and disposition policy. Federal agencies will assure that real property holdings under their control are being fully utilized and are being put to optimum use. Agencies will conduct systematic, thorough reviews of their real property holdings, at least annually, to identify property which is not needed, underutilized or not being put to optimum use. When other needs for the property are identified or recognized, the agency will determine whether continuation of the then existing use or another Federal or other use would better serve the public interest, considering both the agency's needs and the property's location.

In conducting each review, agencies will be guided by paragraph 4 of this Circular, applicable General Services Administration regulations, and such criteria as may be established by the Property Review Board.

a. Utilization standards.

(1) Agencies will promptly identify and release real property holdings, or portions of such holdings, that are no longer essential to their activities and not required for the discharge of the agencies' responsibilities.

(2) Federal real property will be identified as being underutilized whenever a portion or all of the property, with or without improvement, is used only for irregular periods or intermittently for current program purposes of the holding agency, or when current program purposes can be satisfied with a portion of the property.

(3) Even though utilized for current program purposes of the holding agency, Federal real property will be identified as not being put to optimum use if (a) a portion or all of the property, with or without improvement, is of such nature or value, or is in such a location that it is suitable for a significantly higher and better purpose, or (b) the cost of using such property (operation, maintenance, and other incidental costs) is substantially higher than such costs for other suitable property that could be made available to the holding agency through

transfer, purchase, or lease with total net savings to the Nation. Property prices or lease rates as well as costs of moving, occupancy, efficiency of operations, environmental effects, regional planning and employee morale factors should be considered in making such identification.

b. Procedures for improved utilization or disposition.

(1) When an agency identifies a portion or all of a real property holding as underutilized, or as not being put to optimum use, prompt steps will be taken to obtain full and optimum utilization of the property or to arrange for its release unless the holding agency's current program requirements cannot be met elsewhere at lesser Federal cost. Consideration should be given to possible relocation of agency programs to permit release of a portion or all of the property. If foreseeable future programs require retention of such property, efforts should be made to arrange for temporary use of unused portions, including lease to non-Federal parties.

(2) When property is identified as not being put to optimum use and replacement property must be acquired before such property can be released, the agency will initiate action under the acquisition procedures in paragraph 5. If appropriate financing must be obtained or if it will be necessary to secure the enactment of new authorizing legislation, appropriate arrangements should be made to complete any necessary supporting studies and to submit proposals for necessary appropriations or legislation. These proposals should be supported by estimates of the cost of replacing the real property and of the ultimate net savings to the Nation resulting from more efficient use of the property.

c. Property identified as not needed. Real property or a portion thereof identified as not needed shall be reported to the General Services Administration, to the Department of the Interior, or for other disposition as prescribed below.

(1) Real property, except properties in foreign countries, within the term "property," as defined in Section 3(d) of the Federal Property and Administrative Services Act of 1949, as amended, which is not needed by the holding agency to discharge its responsibilities should be promptly reported as excess to the General Services Administration.

(2) Portions of withdrawn public domain, which are no longer required for effective conduct of the program for which withdrawn, will be reported initially to the Bureau of Land Management, Department of the Interior, for a determination by the Secretary of the Interior, with the concurrence of the Administrator of General Services, in accordance with Section 3(d) of the Federal Property and Administrative Services Act of 1949, as amended, whether such property is suitable for return to the public domain. Any such property found unsuitable for return to the public domain and thereafter determined to be excess will be reported to the General Services Administration for further use or disposal.

(3) All other real property covered by this Circular, as described in paragraph 2a, which is not needed will be screened for use for other programs of the agency and made available for such other purposes, if the tests of paragraph 3a are met, or disposed of in accordance with applicable law.

4. Guidelines for identifying not needed and underutilized real property and real property not being put to optimum use. The following general questions will be considered by each agency in reviewing its real property holdings:

a. Is the property being put to its highest and best use?

(1) Consider such aspects as surrounding neighborhood, zoning, and other environmental factors;

(2) Consider whether present use is compatible with State, regional, or local development plans and programs; and

(3) Consider whether Federal use of the property would be justified if an equivalent commercial rental charge for its use was added to the program costs for the function it is serving.

b. Are operating and maintenance costs excessive?

c. Will contemplated program changes alter property requirements?

d. Is all of the property absolutely essential for program requirements?

e. Will local zoning provide sufficient protection for necessary buffer zones if a portion of the property is released?

f. Are buffer zones kept to an absolute minimum?

g. Is the present property inadequate to serve contemplated future programs?

h. Can net savings to the Nation be realized through relocation considering property prices or rentals, costs of moving, occupancy, and increase in efficiency of operations?

i. Have developments on adjoining non-federally owned land or public access or road rights-of-way granted across the Government-owned land rendered the property or any portion thereof unsuitable or unnecessary for program requirements?

j. If Federal employees are housed in Government-owned residential property, is the local market willing to acquire Government-owned housing or can it provide the necessary housing and other related services, thereby enabling the Government-owned housing area to be released?

k. Can the land be disposed of and program requirements satisfied through reserving rights and interests to the Government in the property if it is released?

l. Is a portion of any property being retained primarily because the present boundaries are marked by the existence of fences, hedges, roads, and utility systems?

m. Is any land being retained merely because it is considered undesirable property due to topographical features or encumberances for rights-of-way?

n. Is land being retained merely because it is landlocked?

o. Is there land, or space in Government-owned buildings, which can be made available for utilization by others within or outside Government on a temporary basis?

5. Acquisition policy.

a. Restriction. Real property and interests therein will be acquired, within applicable authorities, only as necessary for effective program operation. Agencies will not acquire, by any method, areas of real property larger than needed for approved programs.

b. Use of existing property. Prior to the acquisition of any real property, each agency will review its existing holdings as prescribed in paragraph 3 to determine whether the new requirement can be met through improved utilization. If the new requirement cannot be met by use of the agency's existing real property, efforts will be made to determine if other suitable existing Federal holdings are available, including the possibility of joint use agreement. Any utilization, however, must be for purposes that are consistent with the highest and best use of the property under consideration.

c. Notification of planned requirements. Prior to the acquisition of any real property, agencies will notify either the General Services Administration; the Bureau of Land Management, Department of the Interior; or the Office of Foreign Buildings, Department of State, as may be appropriate, of their current and future planned requirements. The General Services Administration, the Bureau of

Land Management, and the Office of Foreign Buildings, as appropriate, will advise agencies if excess, unreserved public domain, surplus real property or other real property is or may be available which might meet the need.

In specific cases where the agency's proposed acquisition of real property is dictated by such factors as exact geographical location, topography, engineering, or similar characteristics which limit the possible use of other available property, the notification will not be required. For example, in the case of a dam site or reservoir area, or the construction of a generating plant or a substation, specific lands are needed and, ordinarily, no purpose would be served by such notification.

d. Transfer of excess real property. As a general rule and where compatible with the general provisions of this Circular, excess real property may be acquired by transfer as provided in General Services Administration's Federal Property Management Regulations, Subchapter H, Subpart 47.2, or as otherwise provided by law.

Federal agencies holding excess real property pending possible transfer must refrain from making commitments to other agencies relative to such transfer. When inquiries from potential transferees are received by agencies holding excess property, they shall be referred to the General Services Administration. Agencies seeking property by transfer should make no plans for occupancy until a transfer request is approved by General Services Administration and, where appropriate, by the Office of Management and Budget. Agencies may request special review of proposed transfer actions where program considerations are compelling. The provisions of this paragraph do not apply to excess real property in foreign countries.

e. Requirements preceding real property acquisition. Federal agencies may acquire real property by purchase, condemnation, construction or lease only after the agency head or his designee determines that the requirement (1) cannot be satisfied by better use of existing property, and (2) suitable excess or surplus property, or unreserved public domain land is not available

Agency determinations to acquire real property by purchase, condemnation, construction, or lease will be supported by complete documentation of the efforts the agency has made to satisfy its requirement as prescribed in this paragraph. The determination will include either a statement that the acquisition is limited to the real property necessary for effective program operation and is not larger than needed for approved programs, or an explanation of the circumstances which preclude such limited acquisition.

Budget requests for real property acquisition by purchase, condemnation, construction, or lease must satisfy the justification requirements contained in OMB Circular No. A-11.

With each request for apportionment of funds, or within 30 days thereafter, each agency will furnish to the Office of Management and Budget a list of individual properties, costing $100,000 or more, which are covered by the apportionment. This list (in an original and one copy) will include a brief description and estimated cost of the properties to be acquired. When a request is made for reapportionment of funds, the list submitted will be limited to changes from previous lists. In addition, before any commitment or obligation is made with respect to each such proposed acquisition, the agency will reexamine the availability of alternative real property not requiring the expenditure of funds. A statement will be submitted to the Office of Management and Budget confirming that the reexamination was made and indicating the results. Similar reexaminations will be made for properties valued at less than $100,000,but reports on these proposed acquisitions will be furnished to the Office of Management and Budget only upon request.

6. Permits and outleases. Permits authorizing an agency the use of property held in the custody of another agency will be issued only when (a) a determination has been made by the holding agency that the property is not excess, and (b) the proposed use by the requesting agency conforms to the acquisition and use provisions of this circular. Outleases of such property to State and local governments, corporations, organizations, or private parties shall be

affected only after a similar determination has been made that the property is not excess. Any proposed permit or outlease by a holding agency, except for property in foreign countries, shall be cleared first with the General Services Administration pursuant to Federal Property Management Regulations 101-47.802. An agency authorized to dispose of real property may make excess or surplus property available to another agency for short-term use by permit during the period it is being processed for further use or disposal, providing the requesting agency conforms to the provisions of this Circular.

7. Implementation. The head of each agency or his designee will:

a. Evaluate program needs for real property and develop criteria to achieve effective and economical use of such property in meeting program requirements, consistent with the Federal Property Management Regulations and such guidelines as may be prescribed by the Property Review Board;

b. Issue appropriate instructions to assure that criteria and guidelines for determining whether real property is needed, is fully utilized or is being put to optimum use are understood and uniformly applied, and that not needed or underutilized properties or those not being put to optimum use are identified and corrective action taken;

c. Issue appropriate instructions to assure the conduct of systematic and thorough reviews of all real property holdings annually in accordance with established criteria and guidelines; and

d. Give full cooperation to representatives of the General Services Administration responsible for collecting data and for conducting surveys of agency real property holdings under current authorities and take appropriate action with respect to reports issued by the General Services Administration.

8. Annual report.

a. Preparation. Each agency will prepare a report as of the end of each fiscal year summarizing the action taken by the agency to implement the provisions of this Circular. The first report under this revised Circular will be for fiscal year 1972.

b. Coverage. The report will include the following:

(1) A narrative statement describing, in general, the actions taken during the fiscal year to comply with the provisions of this Circular. This should include a description of the analytical methods used to determine that properties not reported under (2) and (3) below are being put to optimum use.

(2) A list of federally owned real properties remaining in the agency's inventory and identified during the past fiscal year as being not needed underutilized, or not being put to optimum use. For each property listed the agency should furnish an explanation of the action taken or planned in compliance with this Circular.

(3) A list of federally owned real properties remaining in the agency's inventory which were identified in years prior to the past fiscal year as not needed, underutilized, or not being put to optimum use. For each property listed the agency should include information concerning the status of disposition plans and the prospects for remedial action.

(4) A narrative summary describing the agency's acquisition activities. This summary will describe the volume of all real property acquired. In those instances where real property was acquired by means other than the expenditure of funds, estimates will be made of the funds that would have had to be expended if the agency had not taken this action. These latter properties should be identified separately

(5) A description of any problems which the agency is encountering in the management of its real properties.

(6) Recommendations with respect to actions that might be taken by the General Services Administration, the Office of Foreign Buildings of the Department of State, the Property Review Board, or the Office of Management and Budget, as appropriate, to improve the management of Federal real property.

(7) A copy of any new or revised instructions or criteria developed and issued by the agency in implementation of this Circular.

c. Submission. The original and two copies of the report will be submitted by the head of each agency, except the Department of State, to the Director, Office of Management and Budget through the Administrator of General Services no later than October 1 of each year. Concurrently with the submission to the General Services Administration, two copies of the report will be submitted directly to the Office of Management and Budget. The original and two copies of the report of the Department of State will be submitted directly to the Director, Office of Management and Budget.

9. General Services Administration review of agency annual reports. The General Services Administration will review the report received from each agency and will transmit the report together with the General Services Administration comments and recommendations to the Office of Management and Budget with a copy to the Property Review Board no later than December 1 of each year. The General Services Administration review will include the following:

a. Examination of the list of properties identified by the agency as not being needed, underutilized, or not being put to optimum use. The General Services Administration will recommend any other properties which it believes should be added to those identified in the agency report.

b. Evaluation of relative priorities for relocation of agency programs on properties identified as not being put to optimum use. The General Services Administration will prepare a priority listing to realize more efficient use of property by other Federal agencies, State and local governments, or the private sector. The listing will establish (1) properties best suited for donation to State and local governments for park and recreation purposes, and (2) properties, not suitable for donation, that have potential for high dollar return to the Federal Government through sale to the private sector.

c. Evaluation of agency management of Federal real property. The General Services Administration will recommend measures which might be taken to improve the agency's management of its real property holdings.

GEORGE P. SHULTZ
Director